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Forest Pest Management
Pacific Northwest Region

ROOT DISEASE SURVEYS 1984-85

ALSEA RANGER DISTRICT

SIUSLAW NATIONAL FOREST

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ALSEA RANGER DISTRICT, SIUSLAW NATIONAL FOREST

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Forest Pest Management
Pacific Northwest Region
Portland, Oregon

Introduction

Between September 1984 and November 1985, forest pest surveys were done in 145 management units (totaling 3,484 acres) on the Alsea Ranger District, Siuslaw National Forest. Surveys were requested by the Silviculture Staff because of a growing concern over the amount of laminated root rot (caused by the fungus Phellinus weirii) that occurs on the District. Purposes of the evaluations were to assess severity and determine distribution of root disease in selected units where pest management opportunities might exist.

Methods

Units selected by the District for survey fell into three general categories: (1) Recently harvested units or units with small trees (5 years old or younger) where knowledge of location and amount of laminated root rot could be useful in determining whether tree species other than Douglas-fir should be planted or replanted; (2) Units with thinned 15-year-old or older plantations where knowledge of root rot intensity and distribution could influence decisions regarding commercial thinning and rotation ages; and (3) Units with intermediate-aged plantations (6 to 15 years old) where knowledge of disease could affect vegetation management and precommercial thinning plans. Units were surveyed in three different ways as follows:

Recent clearcuts and units with small trees - In these units, stumps from the previous stand were readily observable. These units were surveyed by running a series of 2-chain-wide strips across the entire area and examining all stumps, stubs, and snags for evidence of root disease. Stumps were examined for P. weirii-caused stain or decay on the cut surfaces. In addition, stubs, snags, and stumps of trees that had obviously been dead prior to being cut were investigated by excavating two roots on opposite sides of the root collar to a distance of 3 feet and checking each for ectotrophic mycelia of P. weirii or laminated decay with setal hyphae. Using measurements along transect strips, disease centers (all groups of infected stumps, stubs, and snags surrounded by 50-foot buffers) were mapped for each unit. Resource aerial photographs were used to help confirm disease center locations relative to topographic features. Disease centers also were marked on the ground with orange flagging to aid in relocation by field crews.

Units with 15-year-old or older plantations - In stands of these age classes, stumps from the previous stand were virtually impossible to locate and examine. However, most disease foci were expressing themselves as variable-sized groups of dead or dying saplings. Therefore, an aerial survey that assessed relative amount and distribution of mortality in the plantation trees

was used. Current low-level aerial photographs (1:6000) of units to be evaluated were provided by the District. Photos were examined at 10X magnification under an Old Delft scanning steroscope. Each stand was assigned a mortality rating based on percentage of trees interpreted as dead. Categories used were: (a) Light or no mortality--0 to 10 percent of the trees dead, (b) Moderate mortality--11 to 25 percent of the trees dead, and (c) Severe mortality--26 percent or more of the trees dead. Notes were taken on distribution of dead trees in each unit with special emphasis on whether mortality was scattered or concentrated in a portion or portions of the plantation. It was assumed that virtually all mortality observed on aerial photos was caused by laminated root rot. Previous ground checking of plantations on the Alsea District showed this to be a reasonable assumption.

Units with intermediate-aged plantations (6 to 15 years old)- Unfortunately, units in this category proved to be very hard to evaluate. Saplings were large enough and brush thick enough to make complete stump examinations extremely difficult. At the same time, it was questionable whether enough disease was being expressed in the young plantation trees for an aerial survey to provide useful results. Since time was a limiting factor also in assessing plantations of these age classes, it was decided to give them more general examinations than the other types of stands. Four equally spaced transects were run completely across each plantation. Stumps and dead or symptomatic saplings visible along the lines were checked and a general idea of disease intensity and distribution was obtained. Also, at 2-chain intervals along each transect, a plot was established in which the three closest saplings had two roots on opposite sides exposed to a distance of 3 feet from the root collar and examined for ectotrophic mycelia of P. weirii. Thus, generalized maps of root rot in the units and estimates of number of saplings currently infected were obtained.

Results and Discussion

Results of the surveys are shown in the maps in Appendix A and in Table 1. Results were also supplied to the District as they became available and are already incorporated in District records. The results confirm that concerns about the wide distribution and severity of laminated root rot in the Alsea area are well founded. Of all ground-checked units, only 13 percent had no disease. All others had some level of root rot, and 22 percent had extremely severe disease distributed over most of the area. Obviously, laminated root rot needs careful consideration in management prescriptions on the Alsea Ranger District.

Management techniques recommended by Forest Pest Management are already being put into practice by the District. They are as follows:

(1) In recently harvested units, treat diseased areas by replanting root rot centers and 50-foot buffers with tree species that are immune, resistant, or intermediately susceptible to P. weirii (hardwoods, western redcedar, or western hemlock). Be liberal in determining boundaries of disease areas.

(2) In already-planted units with very young trees (5 years old or younger), consider removing Douglas-fir from disease centers and 50-foot buffers. Replant with immune, resistant, or intermediately susceptible tree species.

(3) In 6- to 15-year-old plantations, consider the following options:

(a) If laminated root rot occurs at severe levels, destroy the stand and treat by replanting with immune, resistant, or intermediately susceptible tree species; (b) If laminated root rot occurs at light to moderate levels, favor naturally occurring immune, resistant, or intermediately susceptible tree species in and around disease centers during precommercial thinnings. Do not carry out projects to eliminate hardwoods in diseased portions of stands. Consider a modified precommercial thinning prescription in which all symptomatic trees and neighboring nonsymptomatic Douglas-firs, whose roots could provide a disease pathway to surrounding Douglas-fir, are cut. Remove pathway trees within two normal tree spacings of dead or obviously declining trees. Continue disease monitoring.

(4) In 15-year-old or older plantations that have already been thinned:

(a) Manage those with severe or moderate laminated root rot ratings on shorter than normal rotations. Severely diseased plantations should be clear-cut when trees reach minimum merchantable size. Moderately diseased plantations should be monitored and cut when disease losses become unacceptable. Do not commercially thin such stands. After final harvest, treat sites by planting tree species immune, resistant, or intermediately susceptible to P. weirii; (b) Manage lightly diseased stands in a normal fashion with the following modifications--at the time of commercial thinning, harvest all Douglas-firs in and within 50 feet of any obvious laminated root rot centers. Map location of centers and keep data concerning location in unit records. Just before final harvest, reexamine stands and map any disease centers not already on record. After harvest, treat infected areas and a 50-foot buffer around each by replanting with hemlock, cedar, or hardwoods.

We also strongly recommend that other stands on the Alsea Ranger District be surveyed for laminated root rot, particularly recently harvested units where options for species manipulation at the time of initial planting can be taken advantage of.

Table 1: Mortality ratings for units in Marys Peak area surveyed from low-level aerial photographs (L = light mortality--less than 10 percent of trees dead; M = moderate mortality--10 to 25 percent of trees dead; S = severe mortality--more than 25 percent of trees dead).

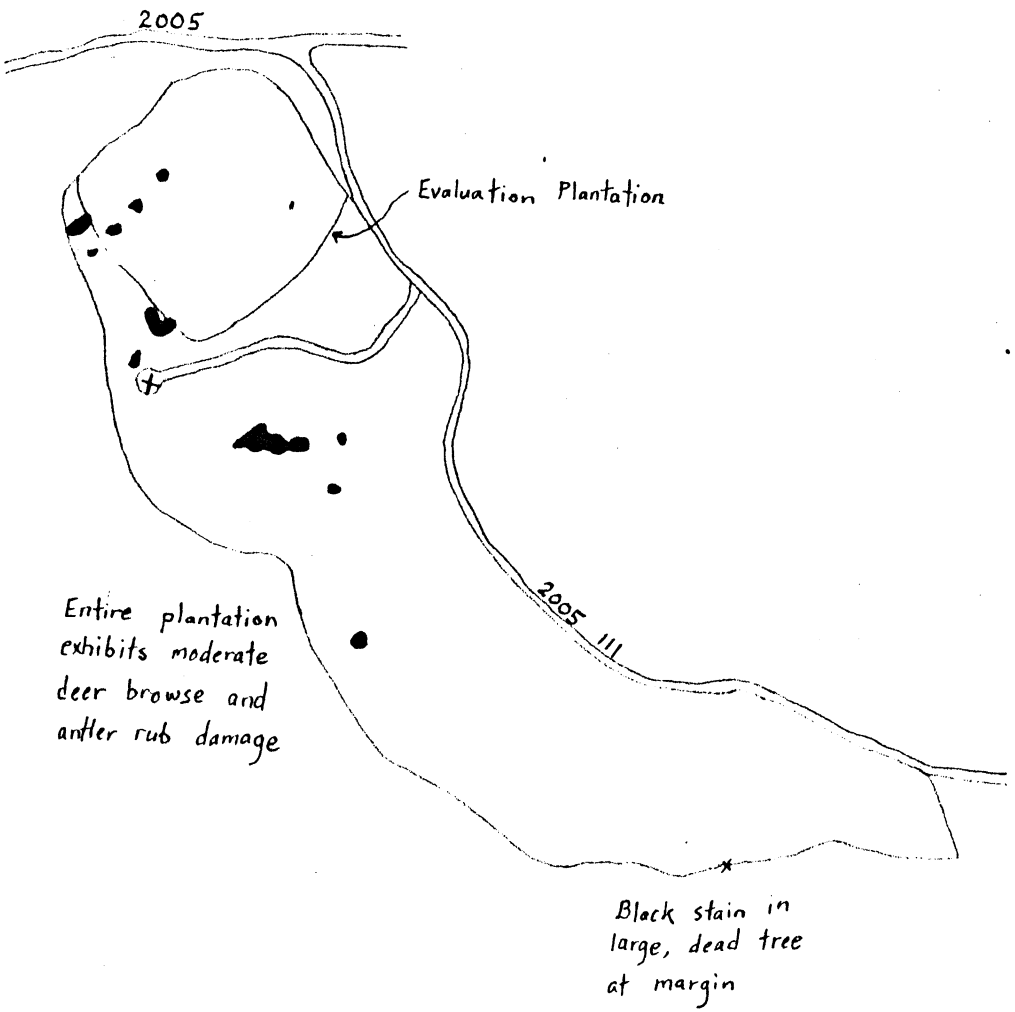
Compartment	Cell No.	Mortality Rating	Comments
3101	1D1	M	Worst in middle of unit
	4D2	M	Scattered throughout; most intense in N
	5E2	S	Scattered throughout; sparse stocking; lots of alder
	6E2	L	Most at E and W ends of stand
	12D2	M	Worst in middle of unit
	13D2	M	Worst in north end of unit
	14D2	M	Worst in middle of unit
	15D2	L	Scattered mortality E of creek
	18C3	L	Little mortality
	19D3	L	Scattered; especially in middle
	24D3	L	Scattered
	25D3	L	Scattered; worse in SE corner
	26D3	M	Scattered throughout
	29C3	L	Considerable brush; no mortality observed
	30D3	L	Scattered in SE corner
	33D3	L	Scattered N of creek; more severe S with sparse stocking
	37D3	L	Scattered; most along S boundary
	39D3	L	Scattered; mortality old
	40D4	L	Small unit with poor stocking
	43D4	M	Many patches of hardwoods
	44D4	S	Mortality throughout unit
	46D4	L	Scattered; most in N 1/4; some sparse stocking
	48D4	M	Worst on W edge near road
	51D4	L	Scattered throughout
	52D4	L	Scattered; mostly in S 1/3
	63C4	M	Most in SW 1/4 and E edge along old road
	92C3	L	Little or no mortality
	93C2	L	Scattered
	165C4	L	Scattered; partially cut stand?
3102	2C2	M	Scattered throughout; bad area in E 1/4
	4D3	L	Scattered
	6D3	L	Scattered; worst in E portion
	8D3	L	Little mortality
	10D4	L	Little mortality
	11C3	M	Severe pocket in E center
	12B3	L	Most along S edge
	15B4	L	Most along E edge
	16B4	S	Scattered throughout; brushy; stocking poor
	18B4	L	Scattered; very little mortality

Compartment	Cell No.	Mortality Rating	Comments
	21B5	M	Large pockets at S
	23C4	L	Some sparse stocking; little mortality
	24C4	L	Scattered; stocking problems in creeks
	25C4	L	Scattered; stocking problems in creeks
	26C5	L	Scattered; stocking sparse in places
	27B5	L	Scattered; difficult to see because of recent PCT
	31A4	L	Little mortality
	32A4	M	Worst in E 1/3
	33A4	L	Scattered
	34A5	L	Scattered; mostly in center of unit
	37B5	L	Worst in center of unit
	38B5	L	Little mortality; stocking sparse in places
	39A5	M	Worst in E
	40A5	S	Severe throughout
	41A5	L	Scattered
	42A5	L	Worst on SE corner and extreme W
	44C5	L	Scattered
	45A5	S	Severe throughout; many holes
	46B3	S	Severe throughout
	47B6	S?	Hard to locate; appears severe throughout
	48B4	L	Most along E edge
	52A5	L	Scattered; mostly older trees dying; poor stocking
	68A5	M	Scattered throughout
	70D3	L	No mortality seen; buildings, etc.
	106B5	L	Very little mortality
	108A5	L	Little mortality
	116B4	L	No mortality seen
	131B5	L	Poor stocking; mostly brush
	134C2	L	No mortality seen
	173B5	M	Lots of alder in unit
	199A5	L	Scattered

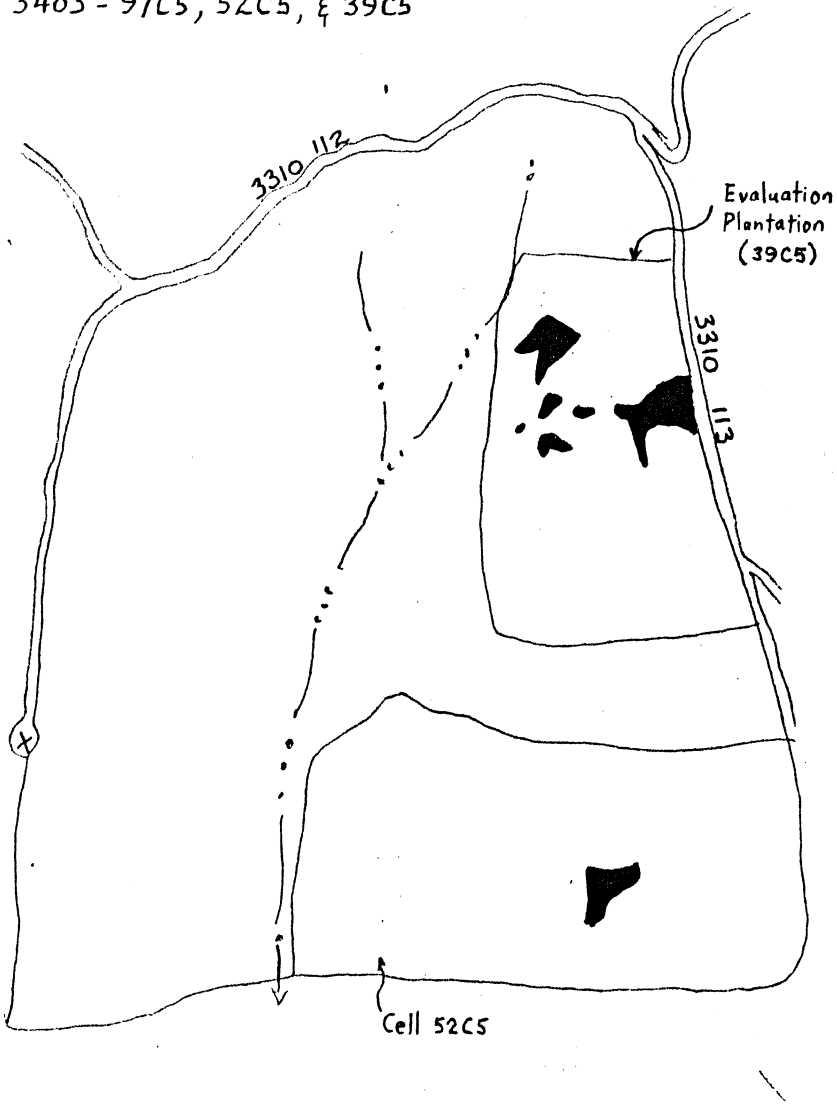
Appendix A

Maps of disease distribution in management units surveyed on the Alsea Ranger District

Chintimin .th and Evaluation Plantation
3101-2E1 & 162E1


2005
Evaluation Plantation
2005 111
Entire plantation exhibits moderate deer browse and antler rub damage
Black stain in large, dead tree at margin

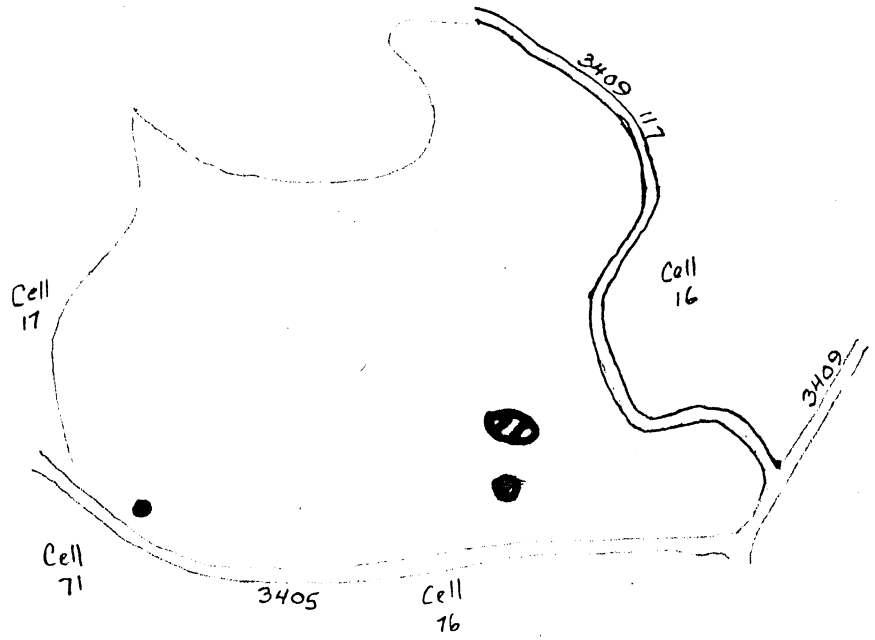
Benner Wilkinson & Evaluation
3403-97C5, 52C5, & 39C5



Phellinus centers (darkened areas) are marked in the field with orange flagging.

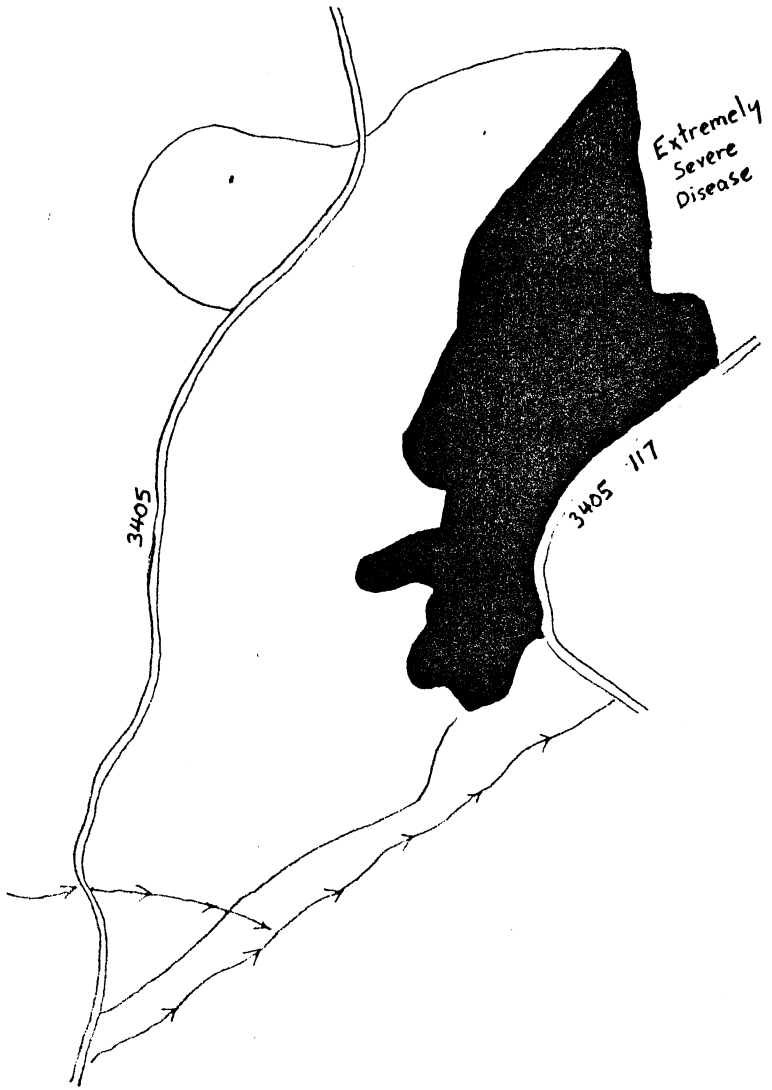
Chintimini Connection U-1

3101-16D2, 17C2, 71C3, 76D3

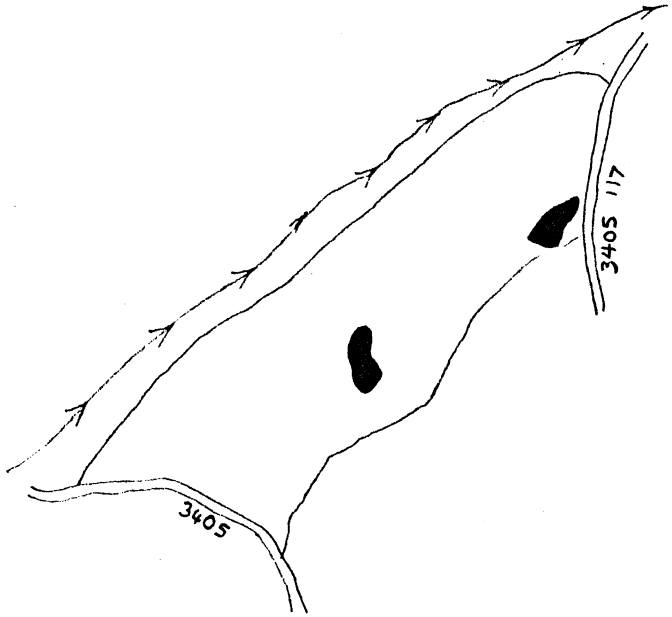


General areas (hatched) affected by Phellinus. Transect survey in this older plantation showed that less than 0.5 percent of the trees are infected. There is, however, considerable evidence of old mortality caused by planting failure, black stain root disease, and possibly fire.

Chintimini Connection
3101 - 22 D3

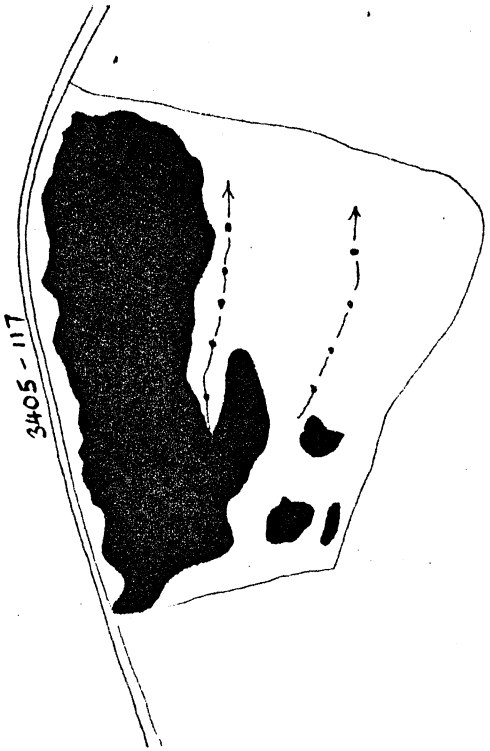


Chintimini Connection
3101 - 161 D3

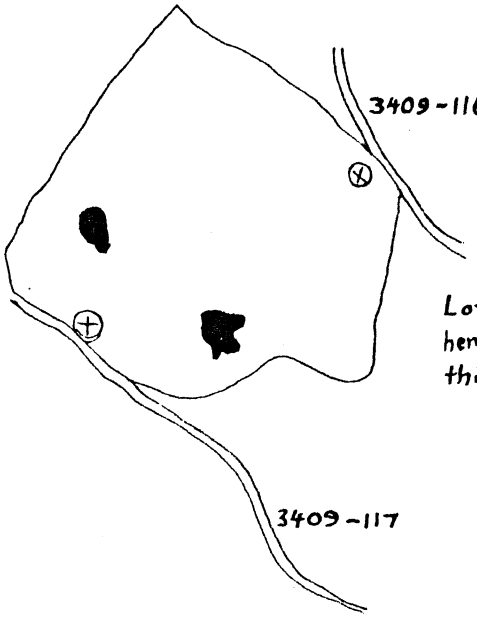


Phellinus centers (darkened areas) are marked in the field with orange flagging

Chintimini Connection
3101-109D3



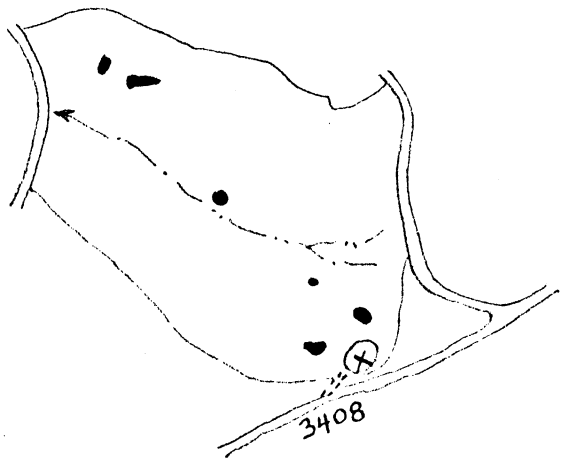
Chintimini Connection 78
3101-107D2 & 108D2



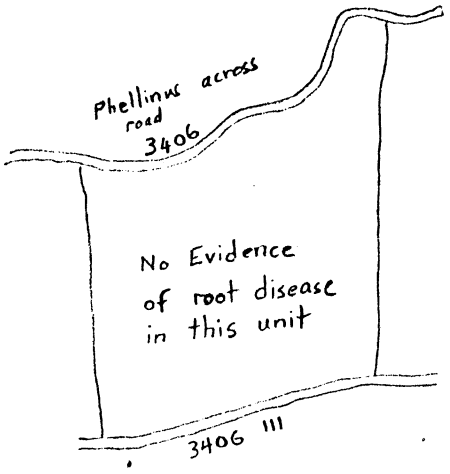
Lots of western hemlock naturals in this unit.

P. weirii infection centers (darkened areas) are marked in the field with orange flagging.

City Sale # 44
3102 - 92B4

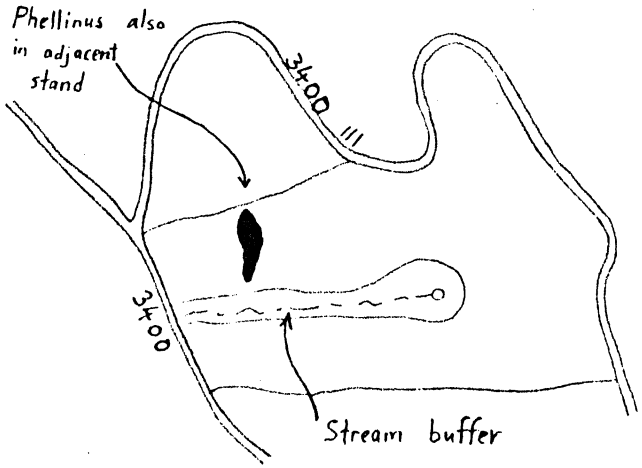


City Sale 43
3102 - 114D3

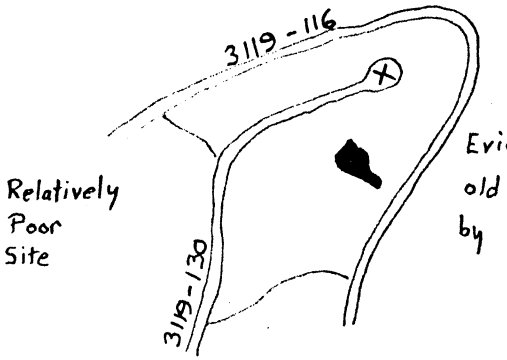


Phellinus centers (darkened areas) are marked in the field with orange flagging.

City Sale 43
3102 - 163 D3



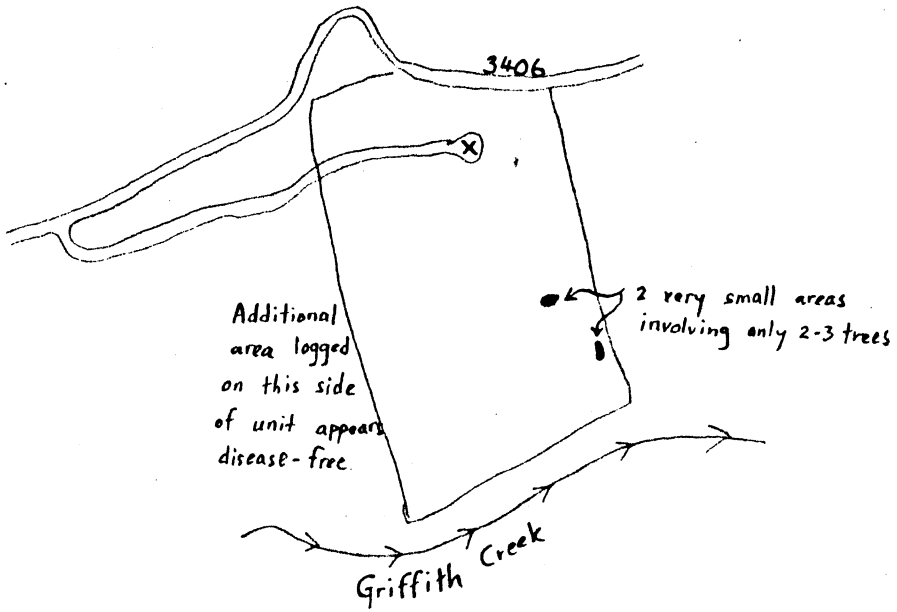
Savage Salvage
3202 - 180 D5



Evidence of considerable old mortality not caused by Phellinus in this stand

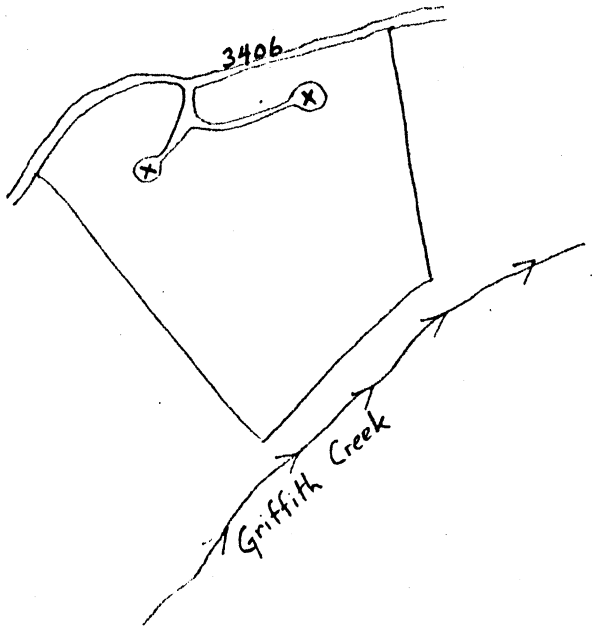
Phellinus centers (darkened areas) are marked in the field with orange flagging.

Griffith Middle 84 U-3
3102-166 C4


3406
2 very small areas involving only 2-3 trees
Additional area logged on this side of unit appears disease-free
Griffith Creek

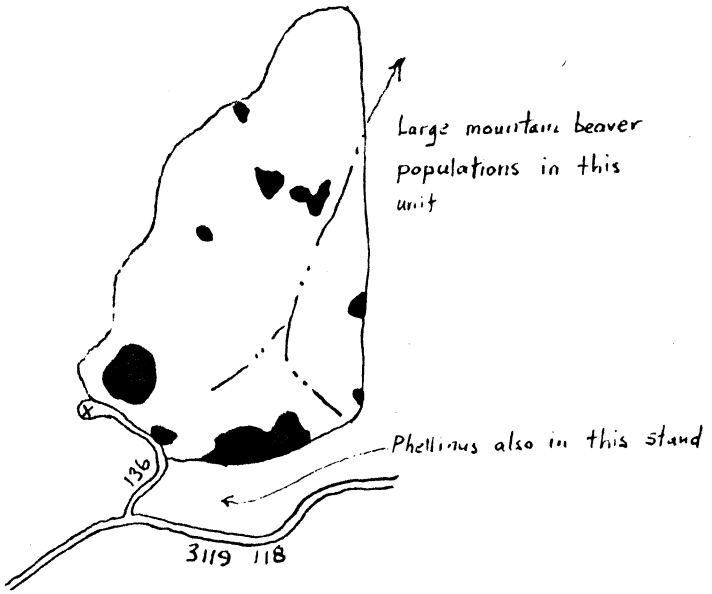
Phellinus centers (darkened areas) marked in the field with orange flagging

Griffith Middle 84 U-4
3102-167 C4



No evidence of root disease in this unit.

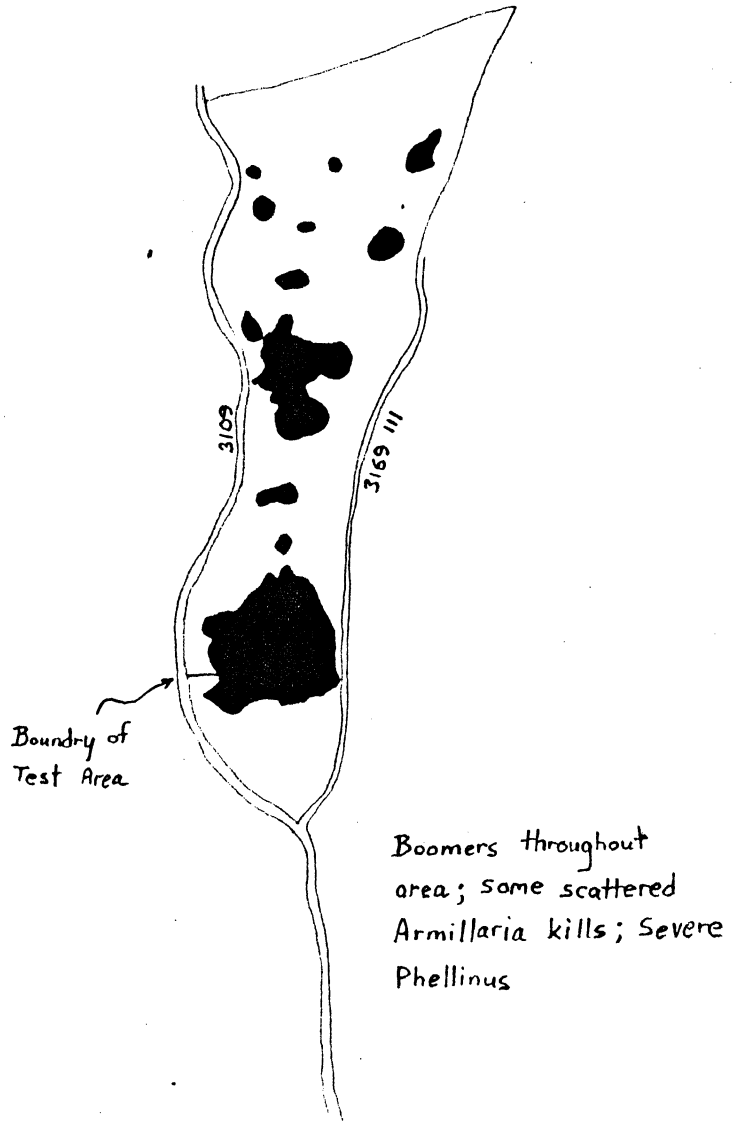
Randal Savage 74 U-3
3202-65 D5



Ryan Salvage U-1
3502-70 D3

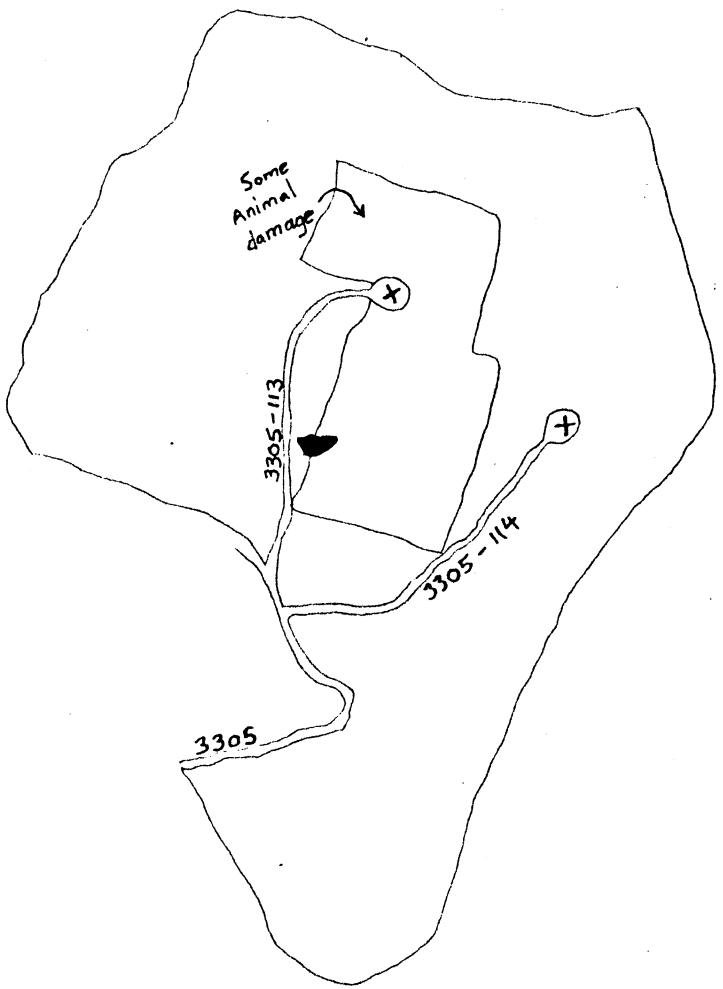
Phellinus centers (darkened areas) are marked in the field with orange flagging.

Randall Savage Evaluation
3203-85B4



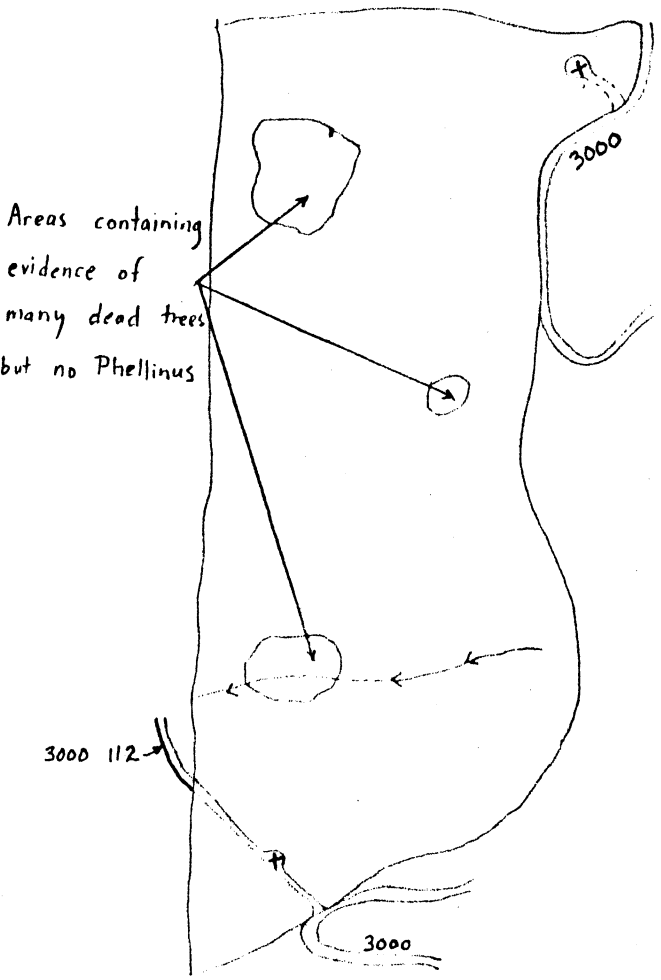
Boomers throughout area; some scattered Armillaria kills; Severe Phellinus

Denzer Camp Evaluation
3405-93D3



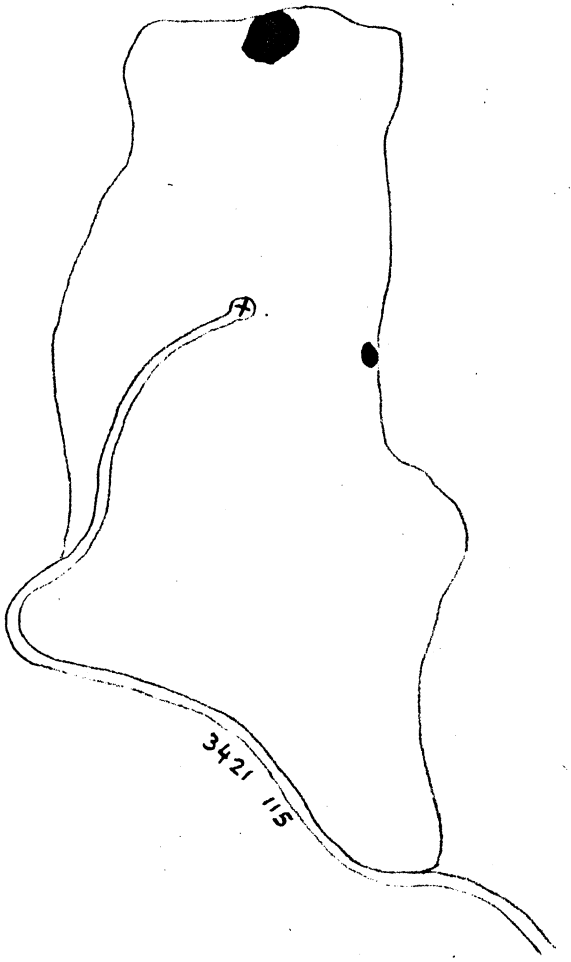
Darkened areas have P. weirii infection and are marked in the field with orange flagging.

Chinquapin Switchback
3204 - 20F5



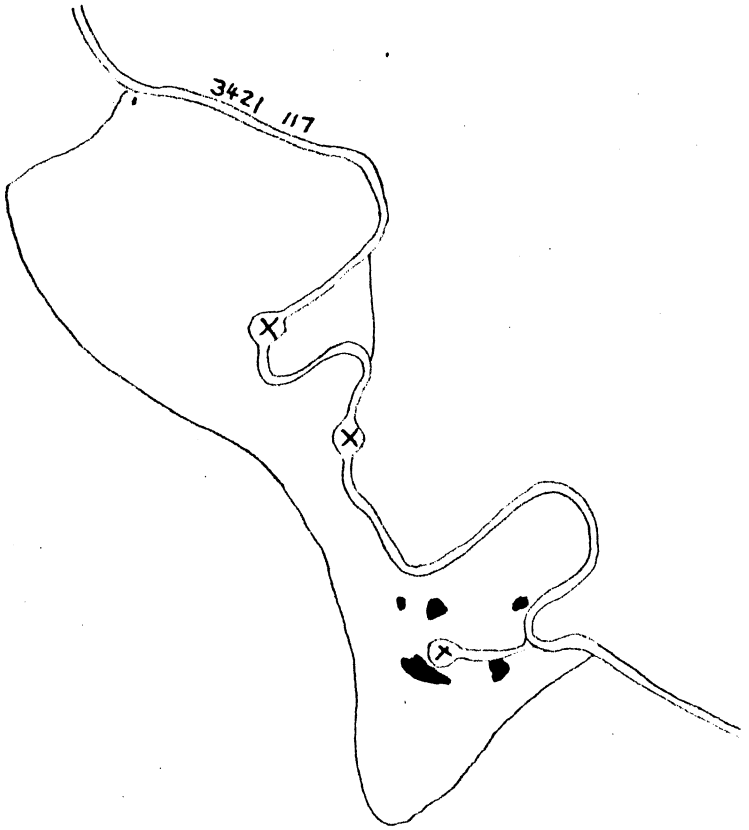
No evidence of Phellinus in unit but there was considerable Phaeolus schweinitzii (not a threat to next generation if managed on normal rotation).

Scott Hellion
3301 - 36C2 & 37C2



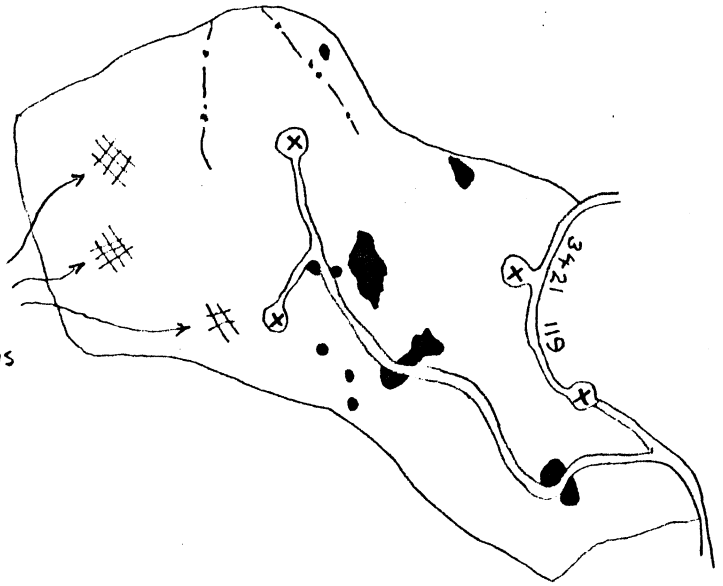
Phellinus centers (darkened areas) were marked in the field with orange flagging.

Scott Hellion 82 U2
3301 - 31C2



Scott Hellion Unit 1
3302 - 43B2

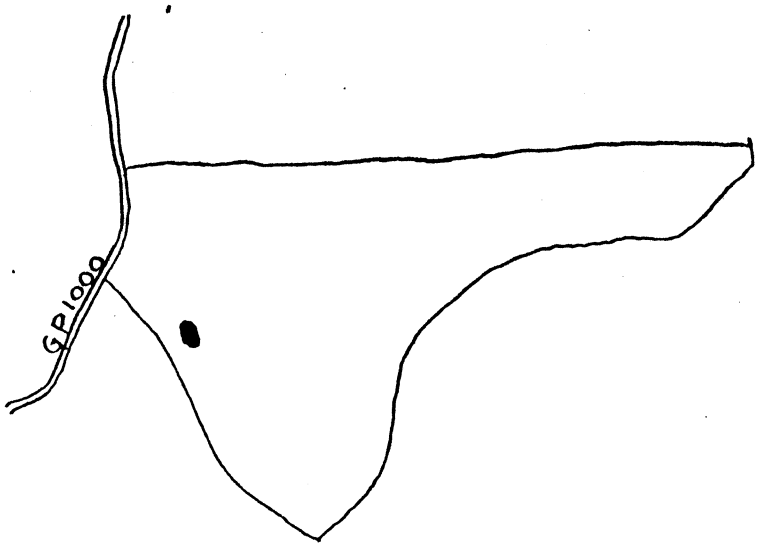
Considerable evidence of old mortality not caused by Phellinus



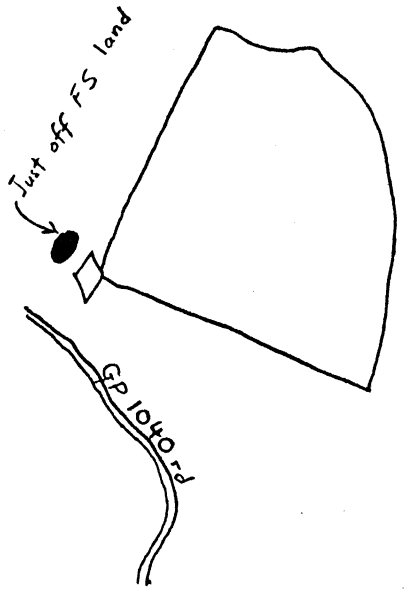
Phellinus centers (darkened areas) are marked in the field with orange flagging.

Nye Drift U-3 B

3303-65B2.

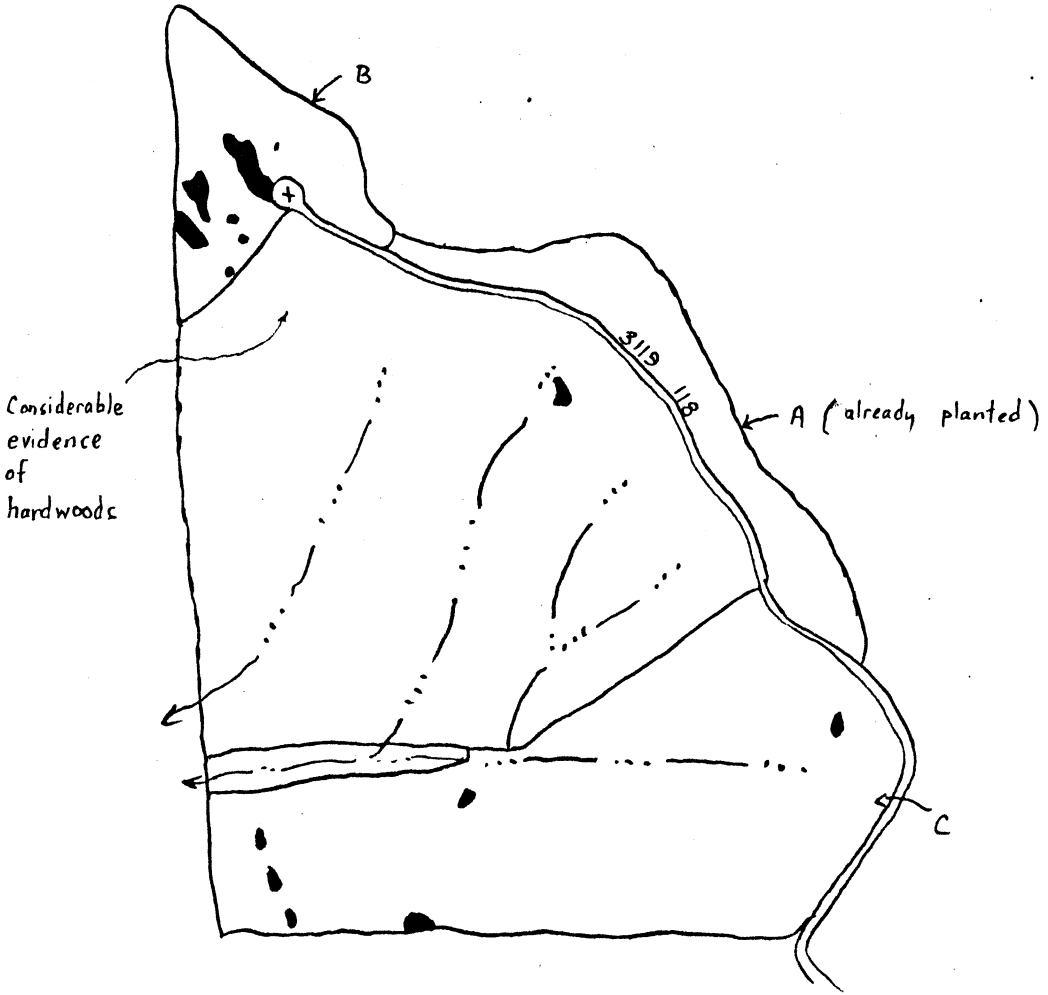


Nye Drift U-4 B

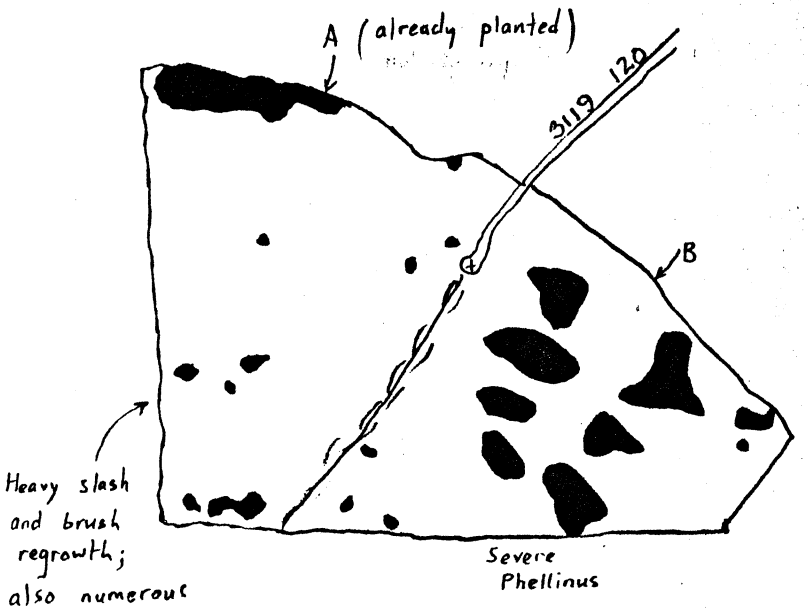


Phellinus centers (darkened areas) are marked in the field with orange flagging.

Nye Drift U-1 A, B, & C
3303-57 B1
3303-64 B1
3202-197 C5

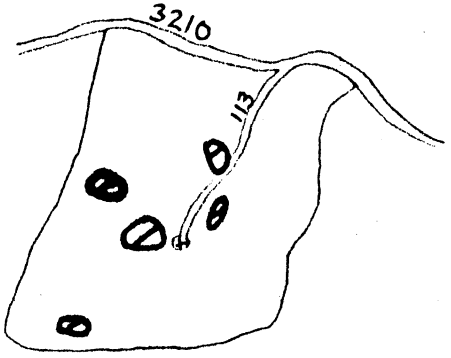


Nye Drift U-2 A & B
3303-58 B1
3303-63 B1



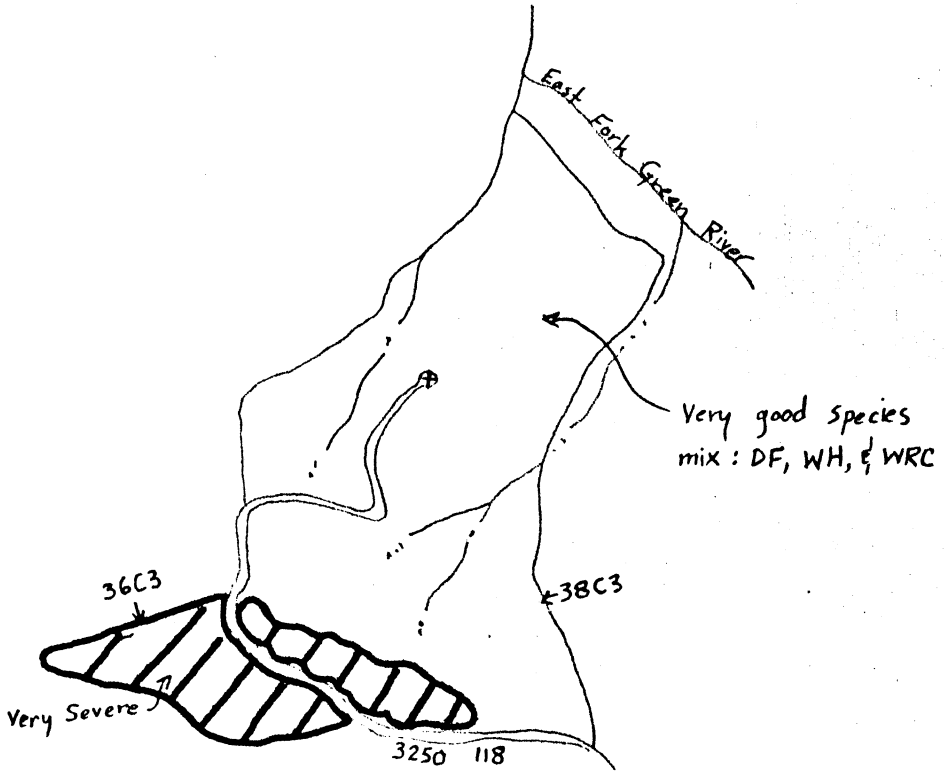
Phellinus centers (darkened areas) are marked in the field with orange flagging.

Pitchfork 1-72
3401 - 32C6



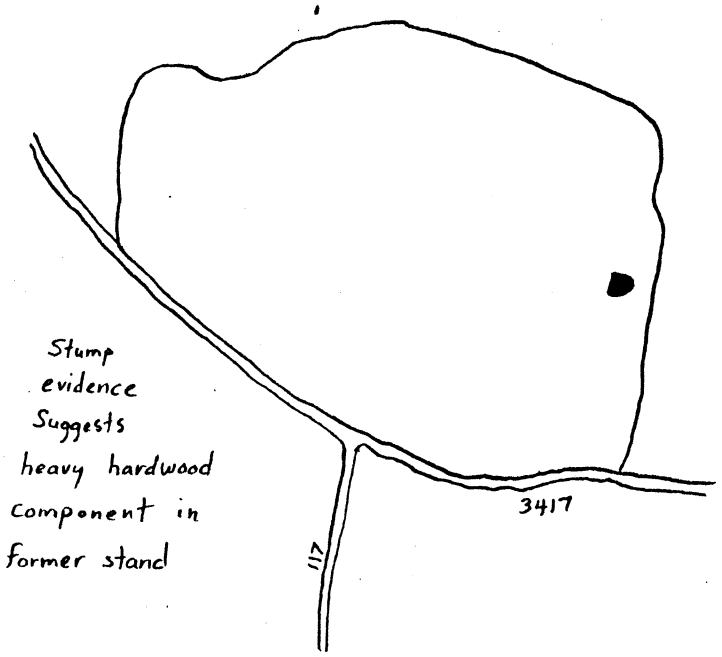
General areas (hatched) affected by Phellinus. Transect survey in this older plantation showed that 2 percent of the trees are infected. Disease distribution is spotty. The stand has a substantial stocking of western hemlock and red alder.

Dutchman Salvage and Green Divide
3503 - 36C3 & 38C3

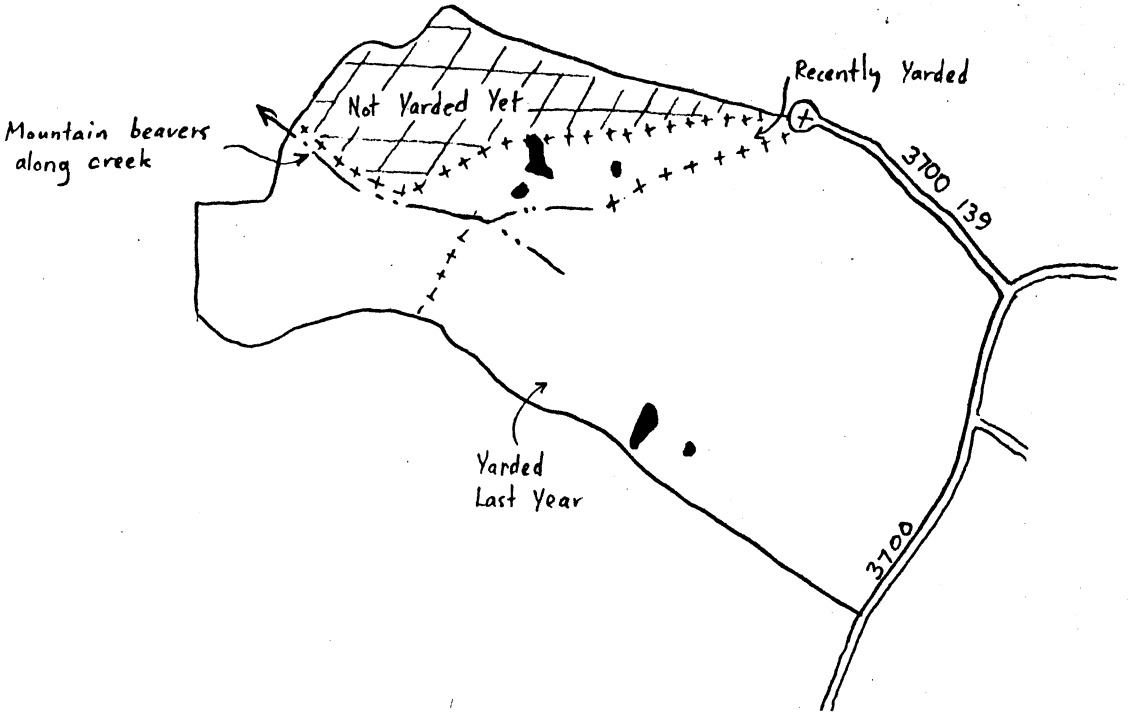


General areas (hatched) affected by Phellinus. Transect surveys in these older plantations showed that 41 percent of the trees in 36C3 are infected and 2 percent of those in 38C3 are. Disease occurs throughout 36C3 and is scattered along the ridgetop in 38C3

Fleece River U-2
3402-68B2

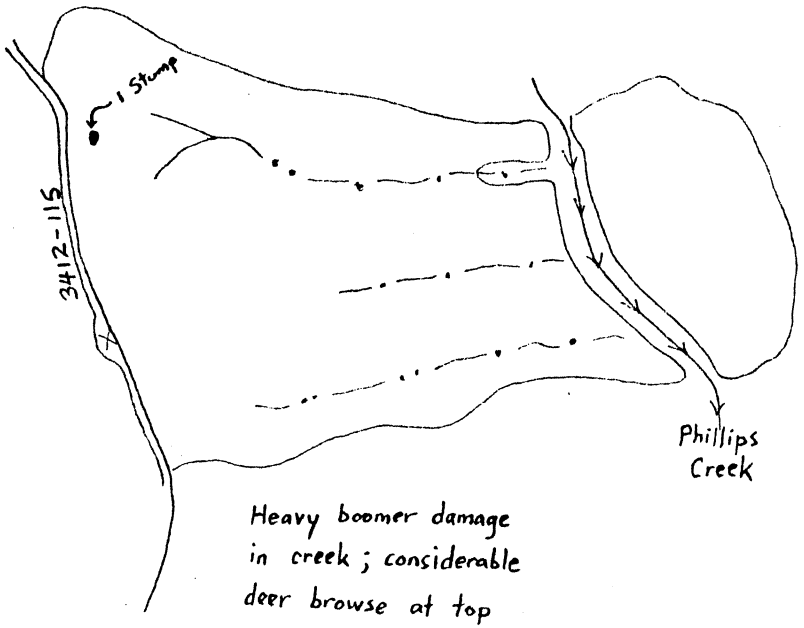


Sietz Crab 83
3501-136C3

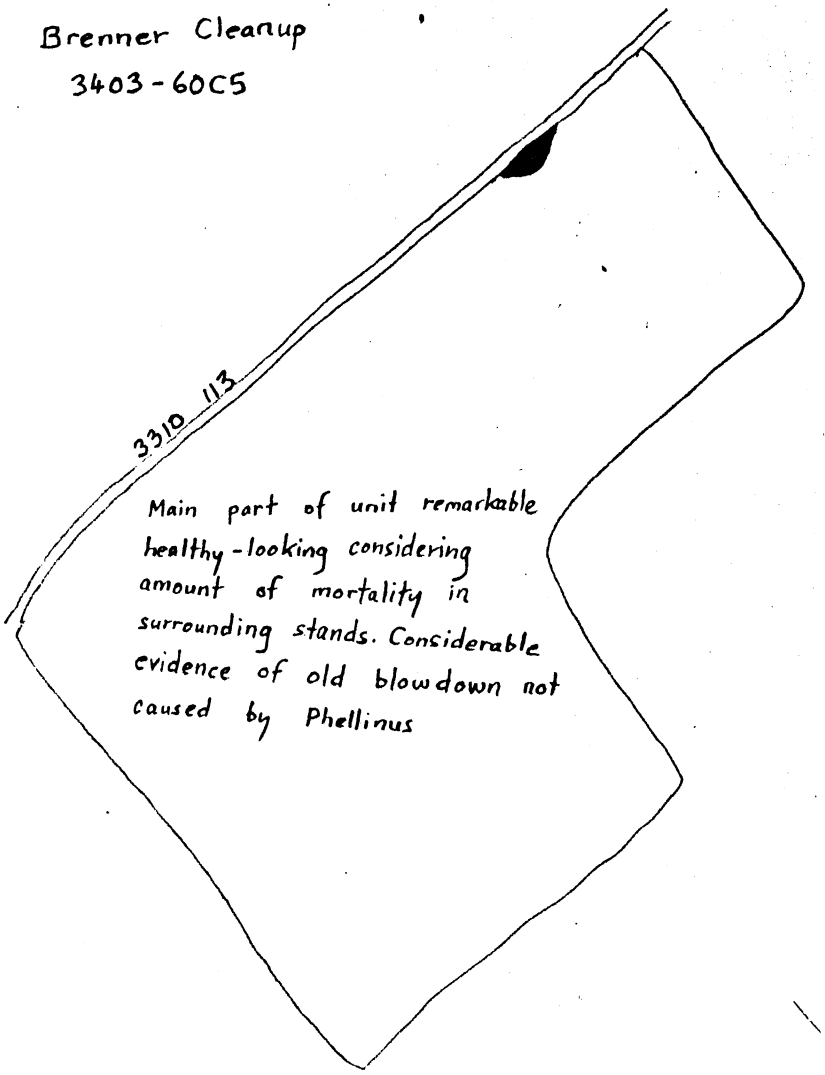


Phellinus centers (darkened areas) are marked in the field with orange flagging.

Fleece Phillips
3402-98D3 & 99D4



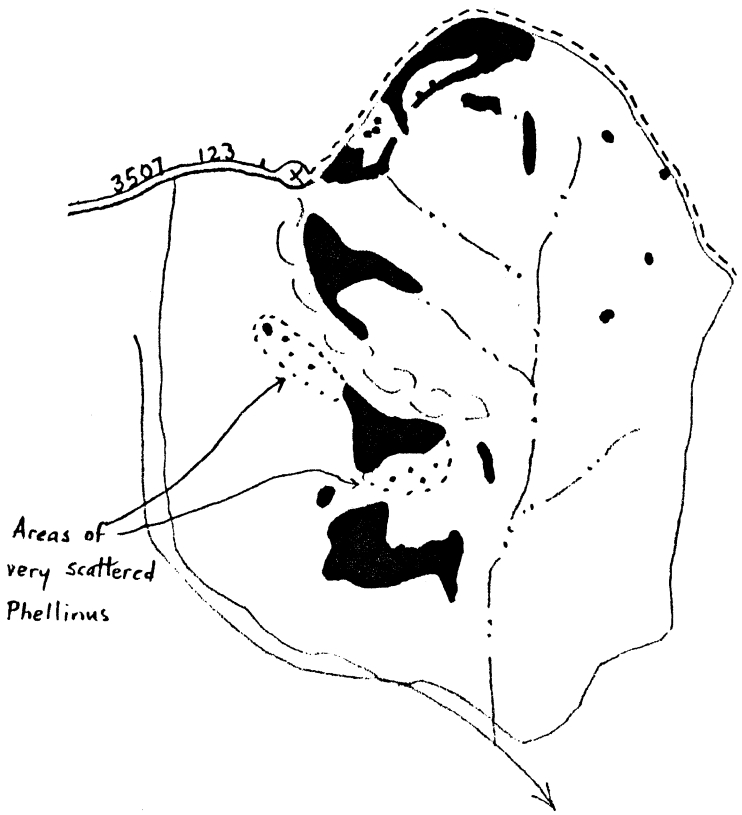
Brenner Cleanup
3403-60C5


3310 113
Main part of unit remarkable healthy-looking considering amount of mortality in surrounding stands. Considerable evidence of old blowdown not caused by Phellinus

Phellinus centers (darkened areas) are marked in the field with orange flagging.

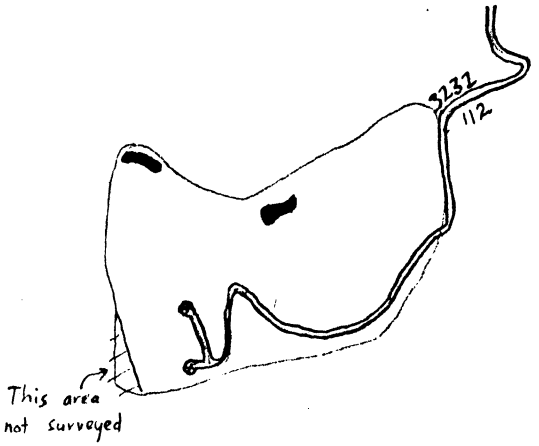
Camp Chilcote 77

3406 93C3



Ryan Bridget 76

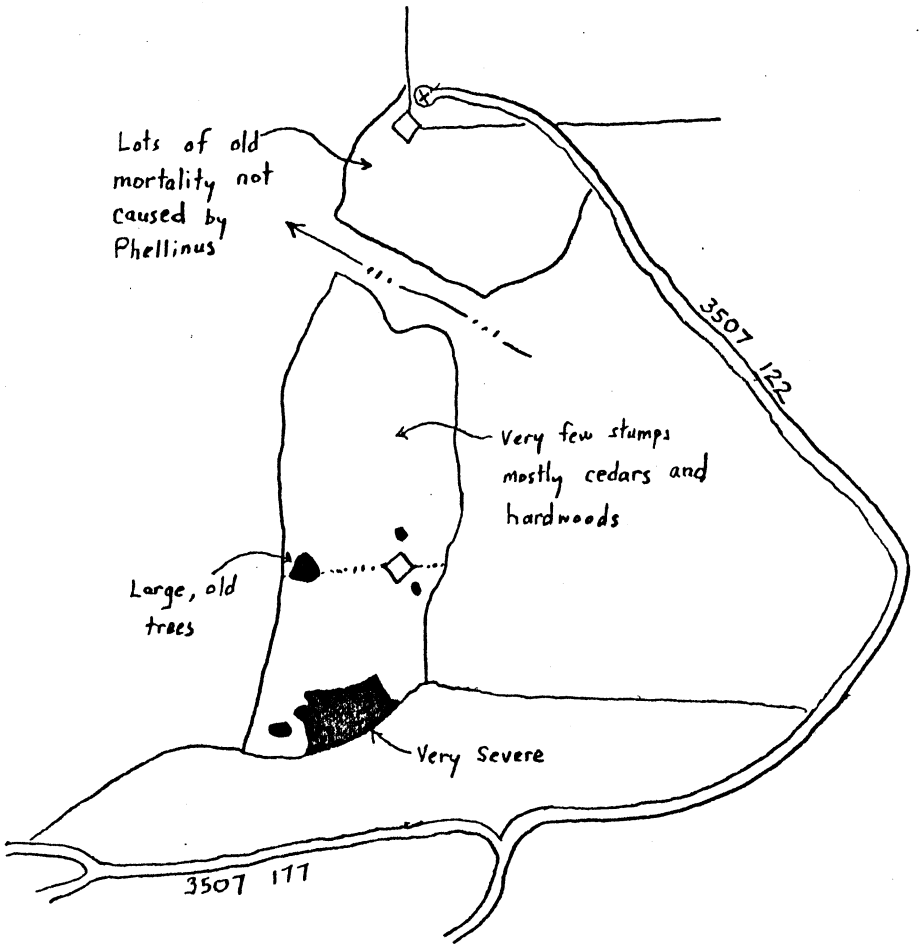
3502 77B4



Phellinus centers (darkened areas) are marked in the field with orange flagging.

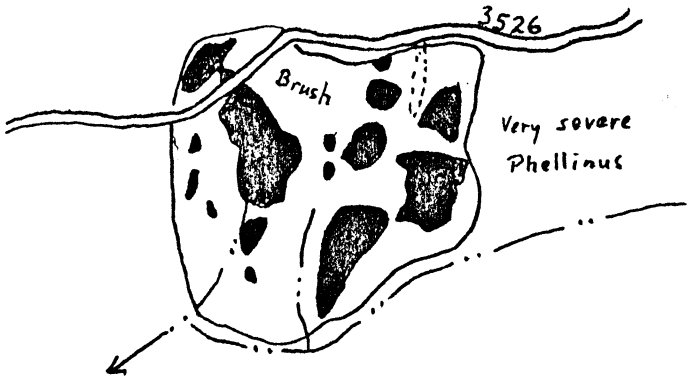
Camp Lobster 84

3406 - 132C2 and 133C2


Lots of old mortality not caused by Phellinus
3507 122
Very few stumps mostly cedars and hardwoods
Large, old trees
Very Severe
3507 177

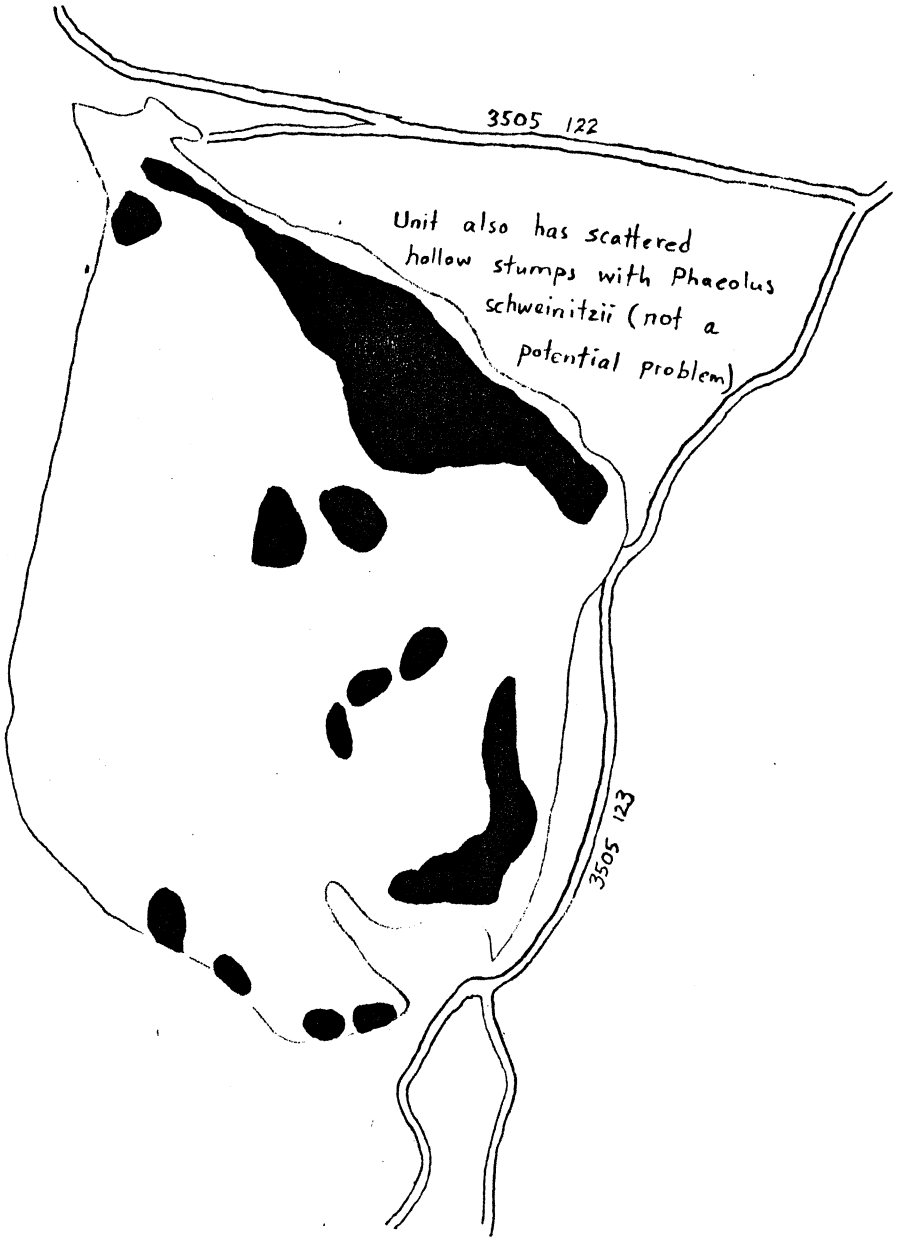
Buck Creek

3505-30 C4

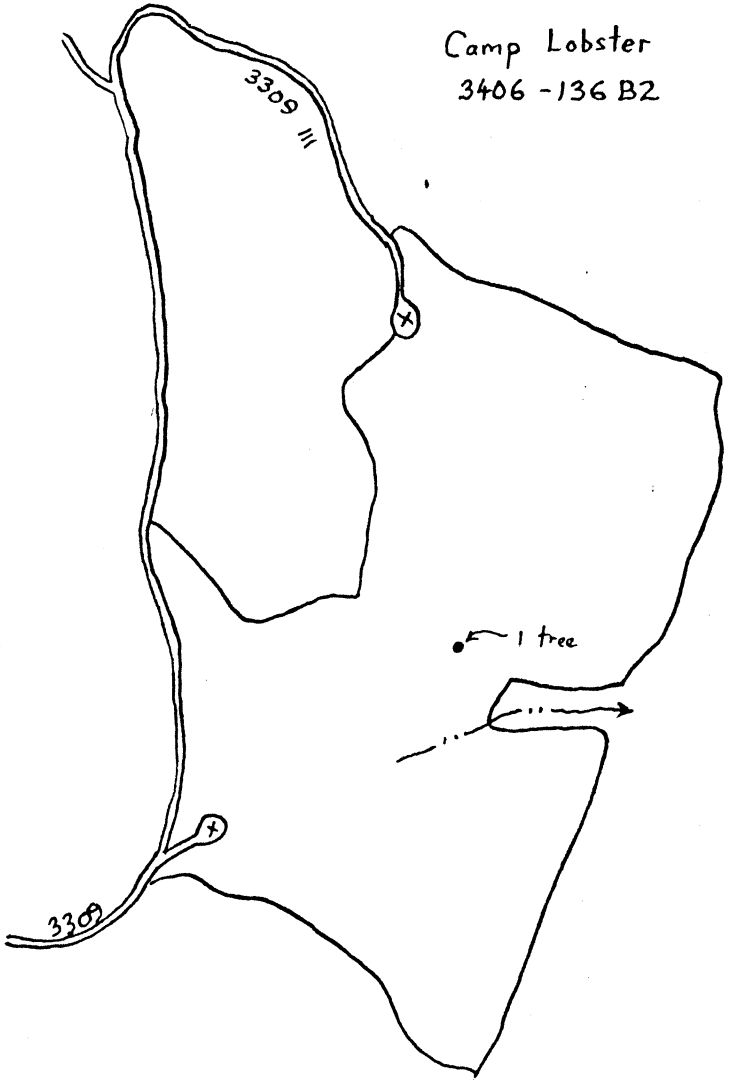


Phellinus centers (darkened areas) are marked in the field with orange flagging.

Camp Lobster U-1
3406 -135 C3



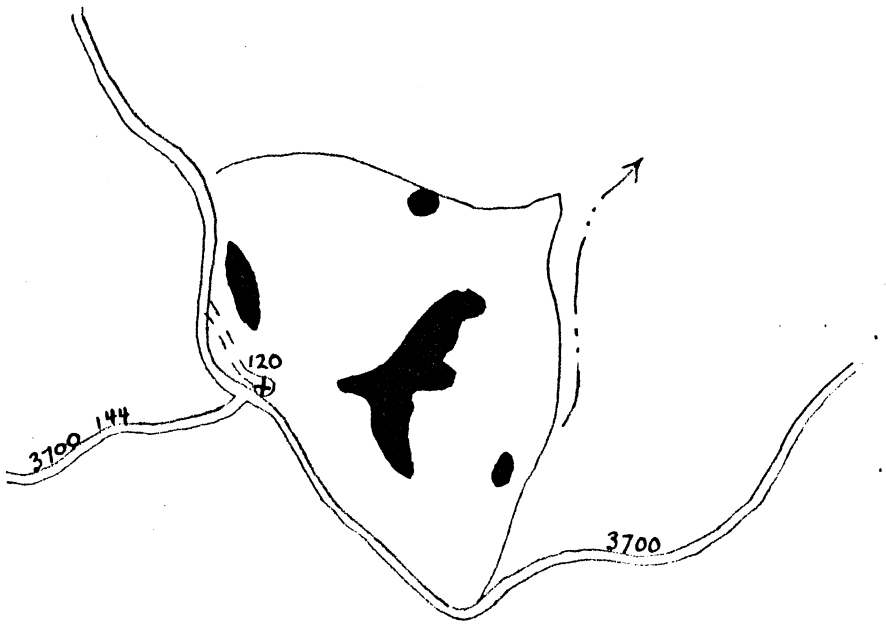
Camp Lobster
3406 -136 B2



Phellinus centers (darkened areas) are marked in the field with orange flagging.

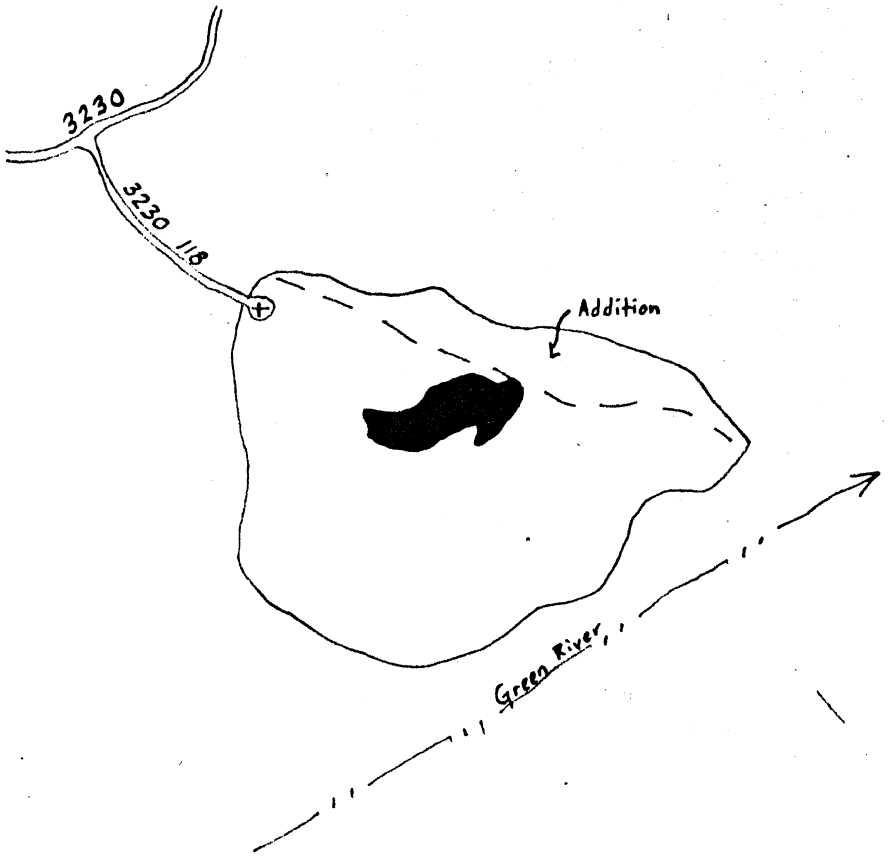
Crab Headwater U3

3501 - 107C4



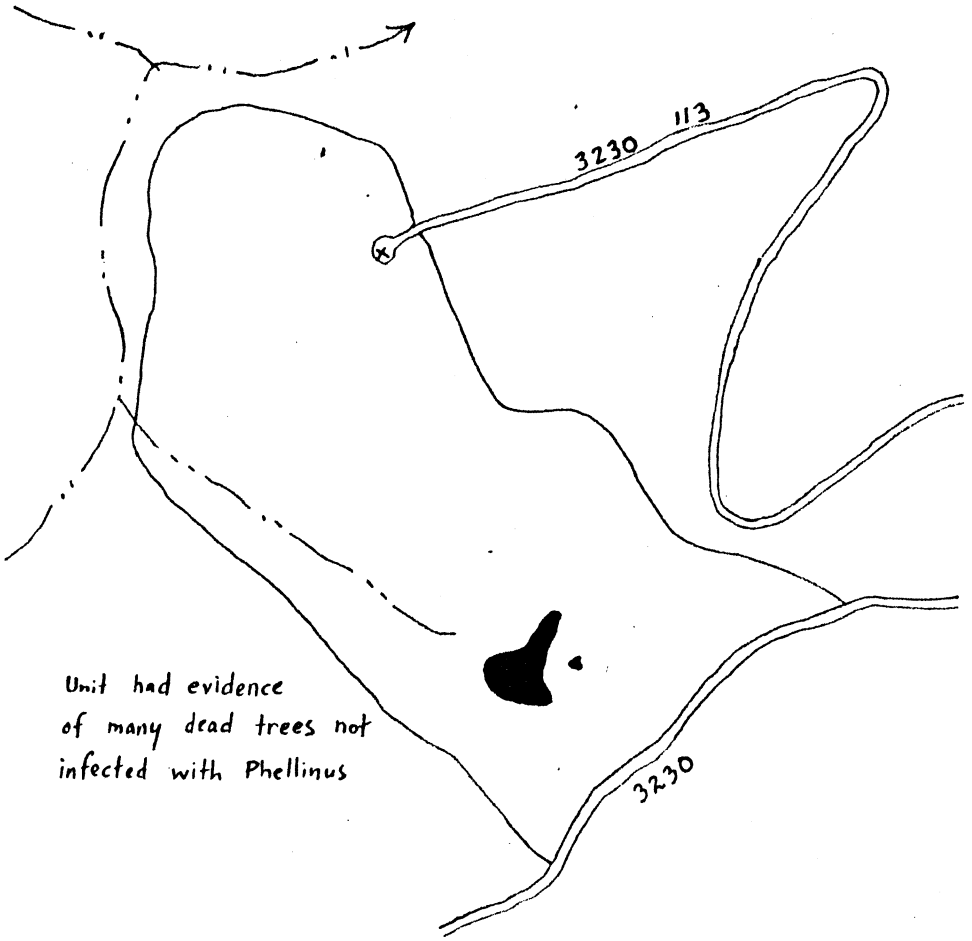
Crab Headwater U4

3501 - 109E4

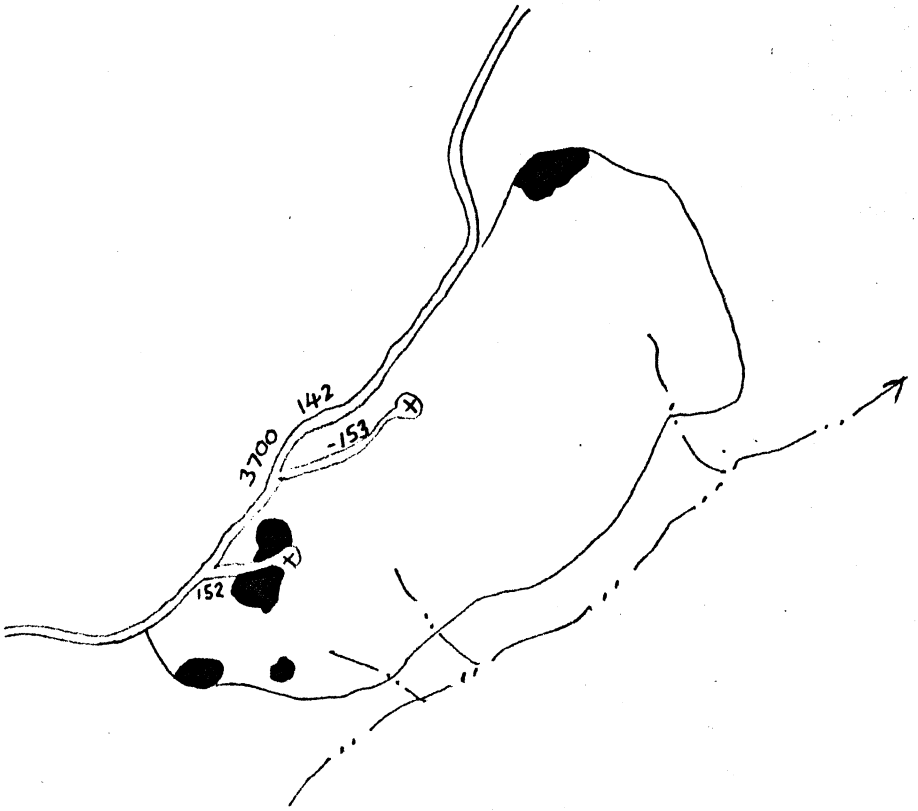


Phellinus centers (darkened areas) are marked in the field with orange flagging.

Crab Headwater '83
3501 - 108 D4

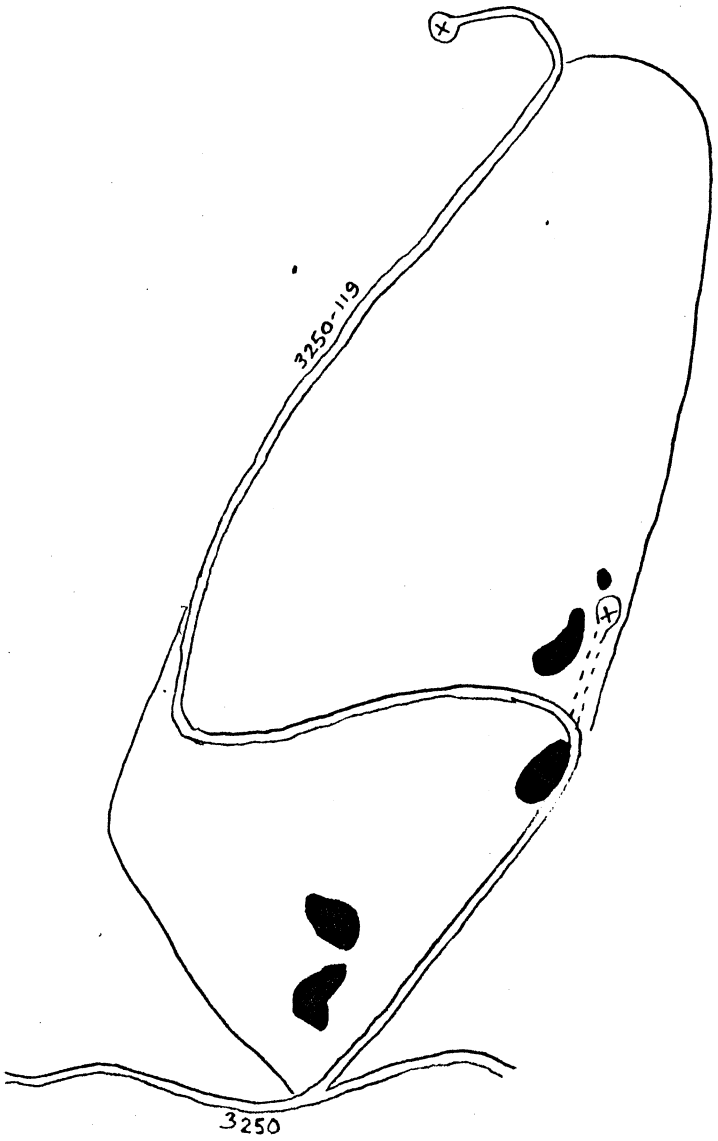


Crab Headwater '83
3501 - 110D4

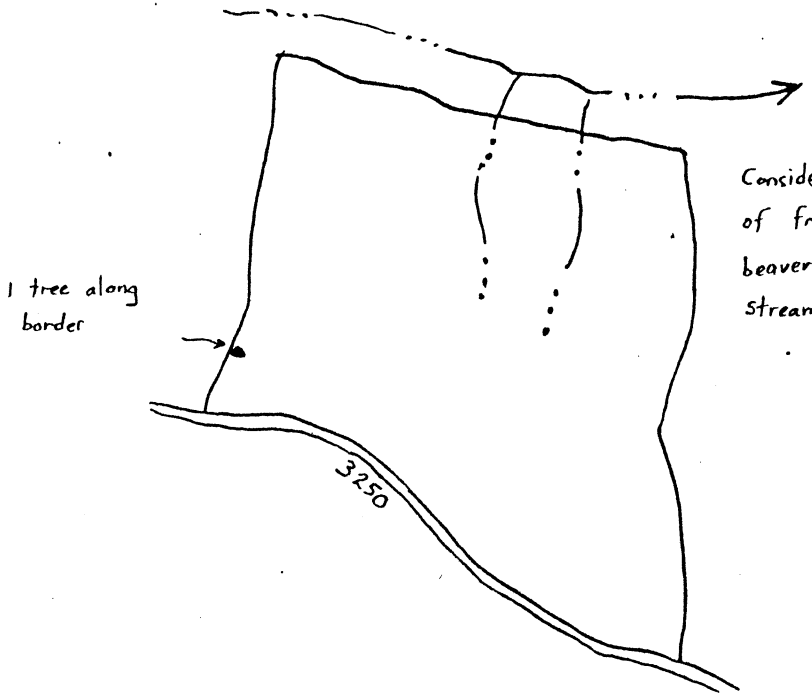


Phellinus centers (darkened areas) are marked in the field with orange flagging.

Crab Apple U-2
3501-138D3

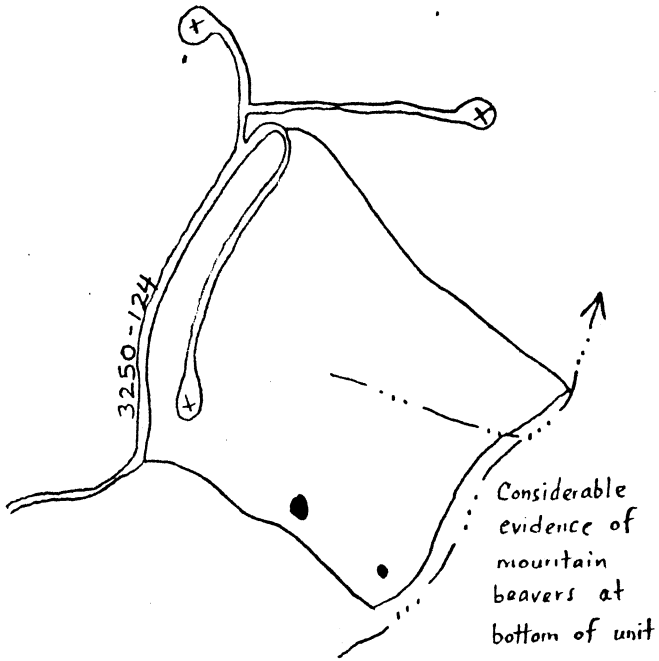


Crab Apple U-3

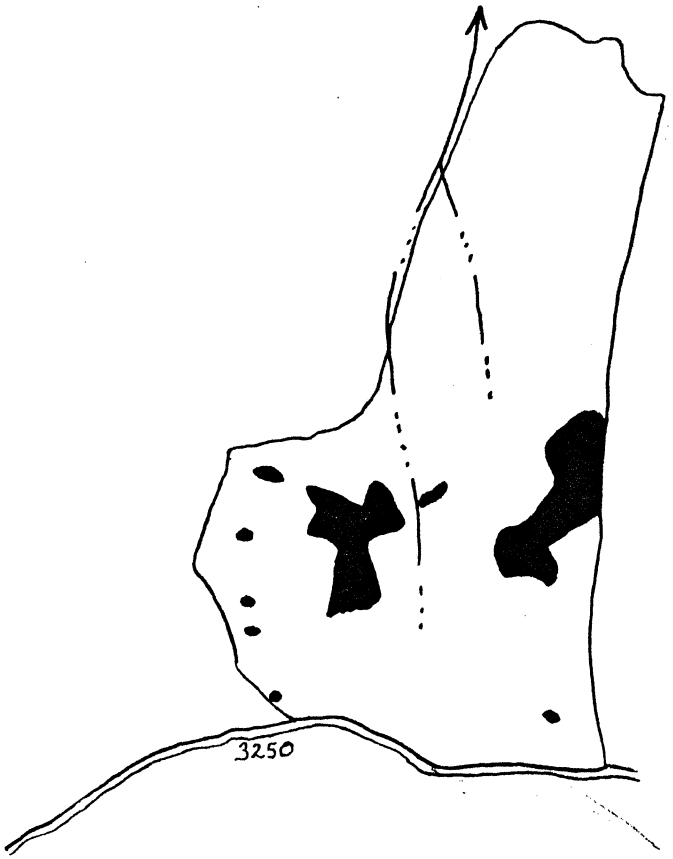


Phellinus centers (darkened areas) are marked in the field with orange flagging.

Crab Apple U-4
3501-140 D5



Crab Apple U-5
3501-141 C5

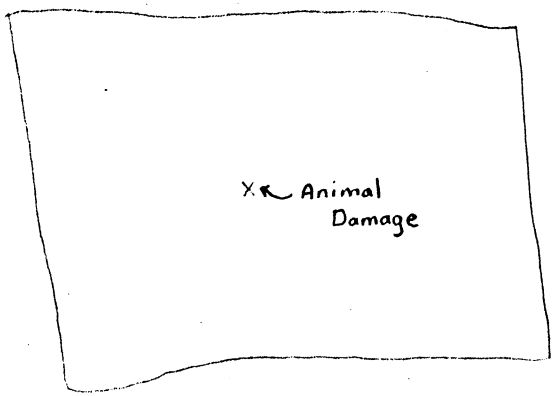


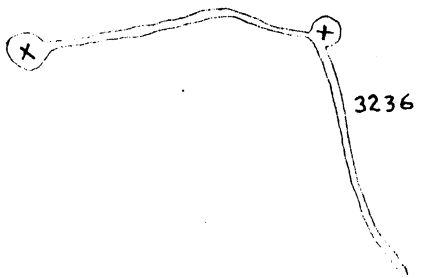
Phellinus centers (darkened areas) are marked in the field with orange flagging.

Ryan Green Evaluation

3502-103C3

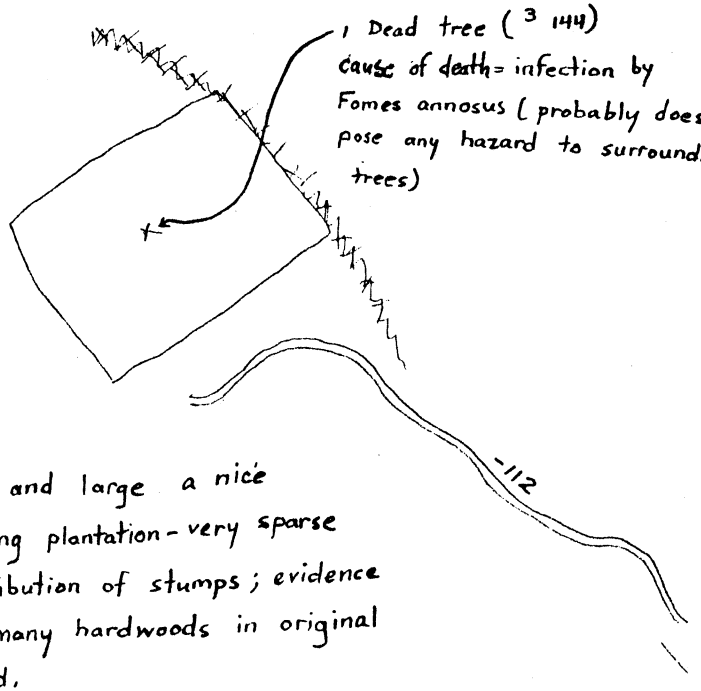
Evaluation plantation looks good!





Fleece Bear U4

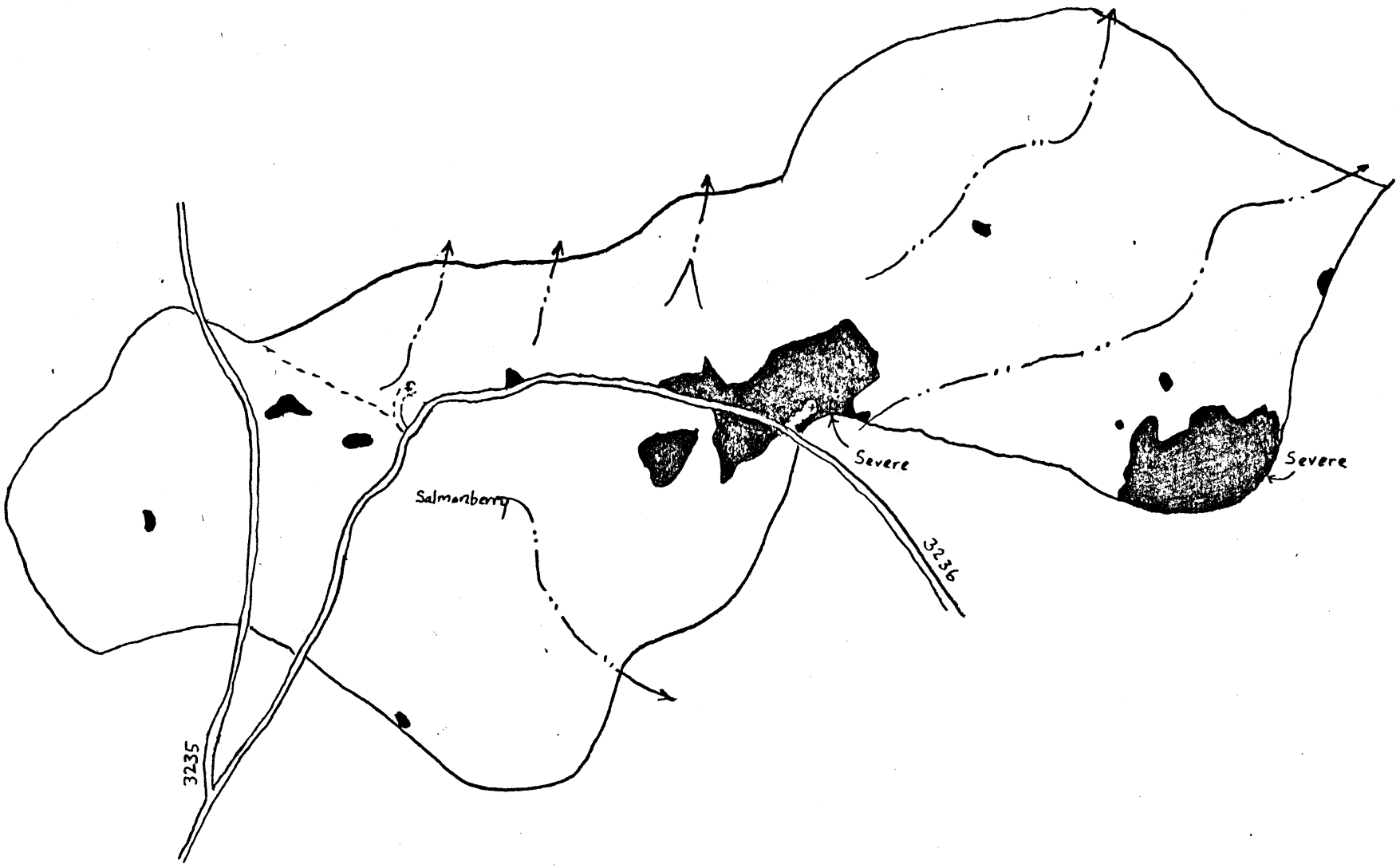
3402-57D3



By and large a nice looking plantation - very sparse distribution of stumps; evidence of many hardwoods in original stand.

Divide Ryan U2

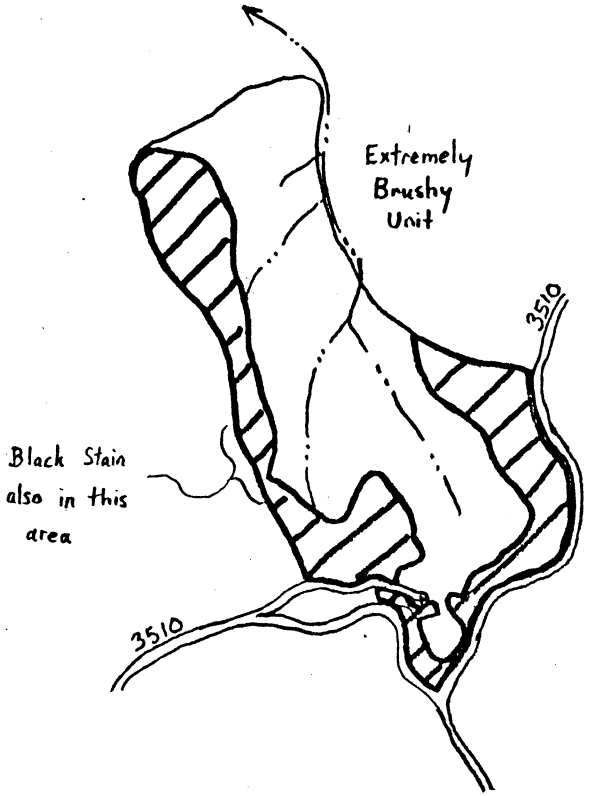
3503 - 77



Phellinus centers (darkened areas) are marked in the field with orange flagging

Minister 1-74

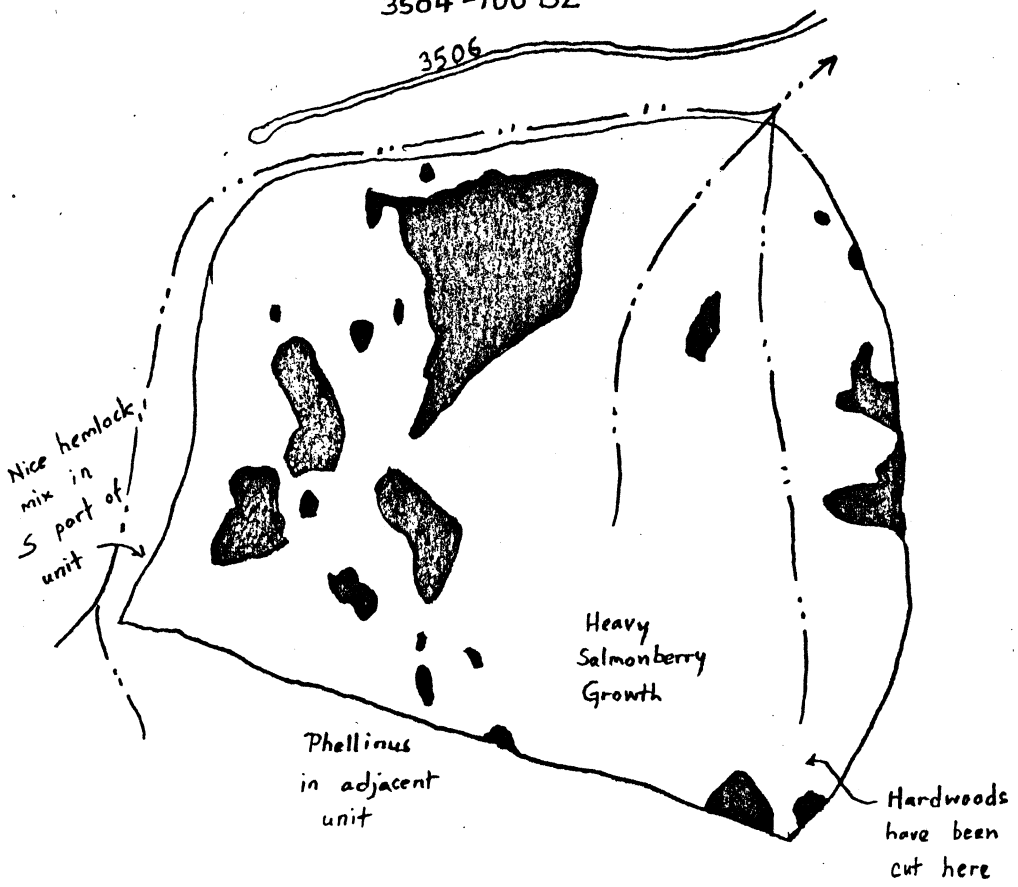
3503-127 F3



General areas (hatched) affected by Phellinus. Transect survey in this older plantation showed that about 13% of the trees are affected.

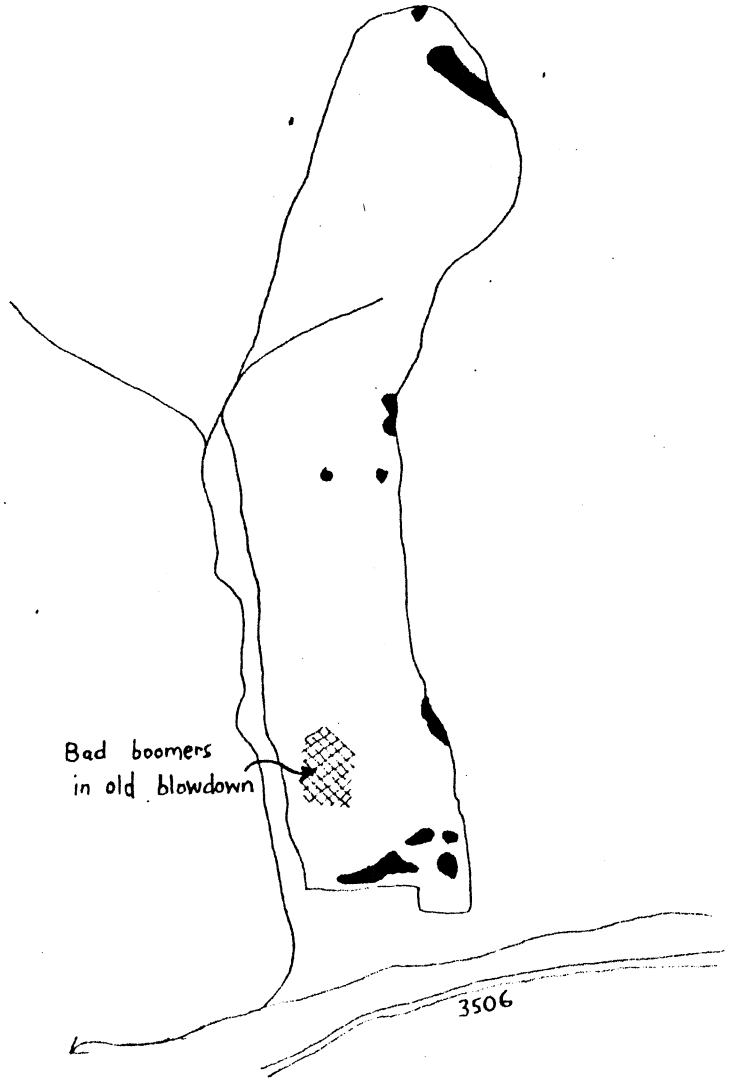
Minister Preacher U-1

3504-100 B2


3506
Nice hemlock mix in S part of unit
Heavy Salmonberry Growth
Phellinus in adjacent unit
Hardwoods have been cut here

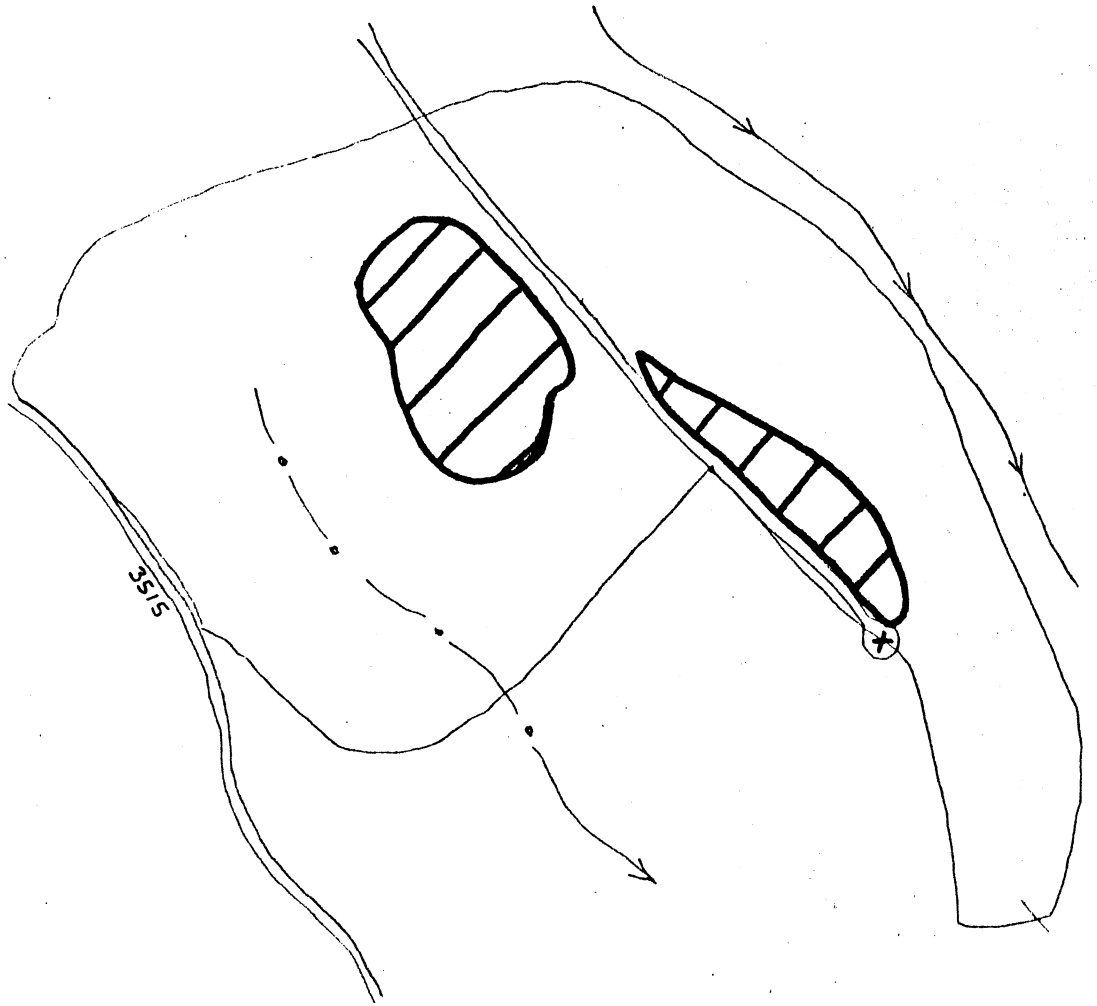
Phellinus centers (darkened areas) are marked in the field with orange flagging

Preacher Creek Salvage
3504 - 1B2



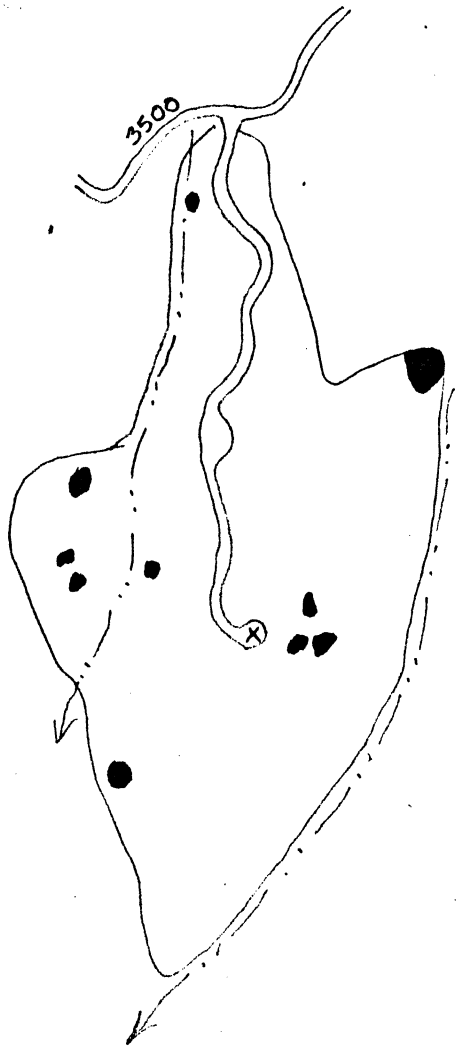
Phellinus centers (darkened areas) marked in the field with orange flagging.

Deadwood 1-74
3504 - 96D3

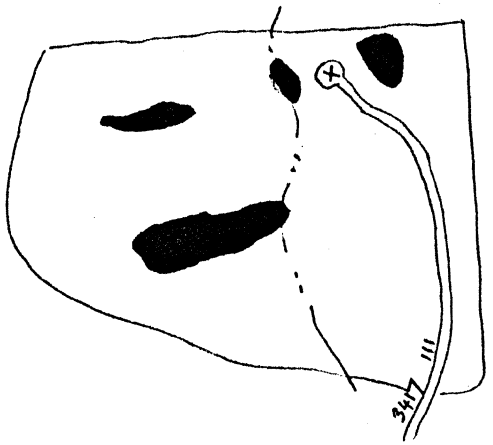


General areas (hatched) affected by Phellinus. Transect survey in this older plantation showed that 3 percent of the trees are infected.

Minister Cleanup 1
3504-91C1



Fleece River '83
3402 64D2



Phellinus centers (darkened areas) are marked in the field with orange flagging.

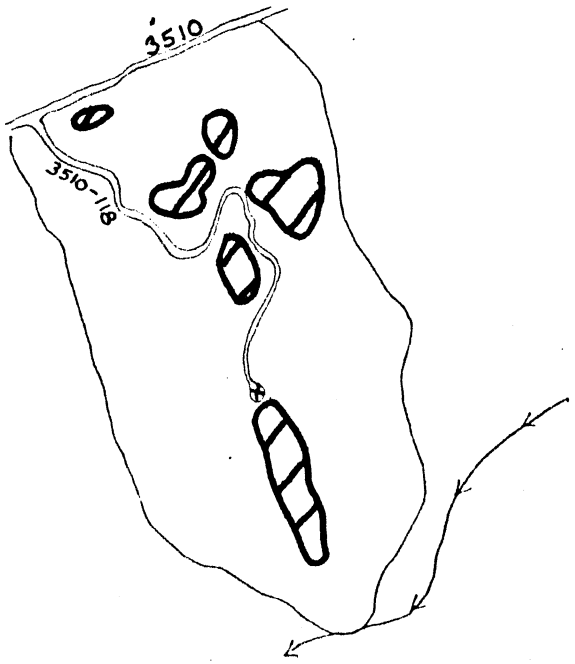
Deadw Bottom U-4

3504-104 A5

Very extensive
Phellinus !

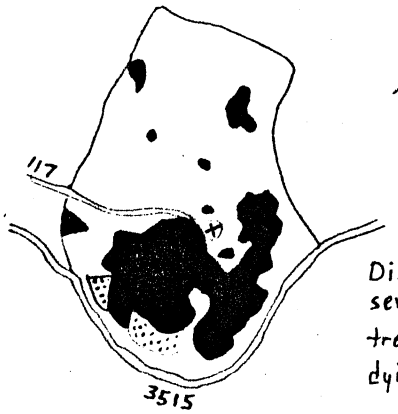
Phellinus cankers (darkened areas) are marked in the field with orange flagging

Minister Skyline
3504 - 119



General areas (hatched) affected by Phellinus. Transect survey in this older plantation showed that 7 percent of the trees were infected.

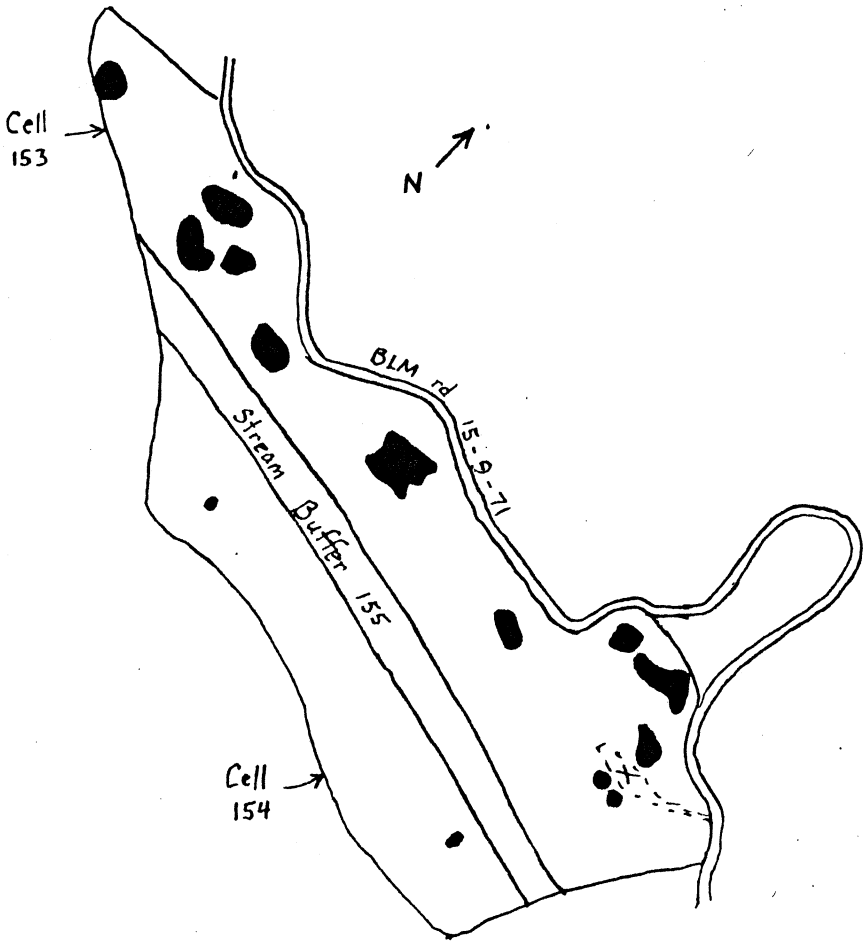
Deadwood Wilson
3505 - 39C2



Disease extremely severe; many 5-year-old trees already dead or dying.

Phellinus centers (darkened areas) are marked in the field with orange flagging. Black stain root disease occurs in the dotted area.

Minister Cleanup U-2
3504 - 153D1 & 154D1



Griffith Pioneer 84 U-1
3102-145

Very nice unit; no evidence of disease

Griffith Pioneer 84 U-2
3102-148

Very nice unit; no evidence of disease

Phellinus centers (darkened areas) marked in the field with orange flagging.

Prepared by: Donald J. Goheen — 1/14/86

DONALD J. GOHEEN, Plant Pathologist — Date

Reviewed by: James S. Hadfield — 1/16/86

JAMES S. HADFIELD, Supervisory Pathologist — Date

Approved by: Paul E. Buffam — 1/16/86

PAUL E. BUFFAM, Director, Forest Pest Management — Date